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NATIONAL PLAN AND STRATEGY FOR WATER QUALITY. PROGRAM SUMMARY

Federal Water Quality Administration
Washington, D. C.

November 1970

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FWQA REPORT
NO. 14-12-910/10

NATIONAL PLAN AND STRATEGY FOR WATER QUALITY

PROGRAM SUMMARY

CLEAN WATER

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U S Department of Commerce
Springfield VA 22151

NOVEMBER 1970

139

FEDERAL WATER QUALITY ADMINISTRATION

PROGRAM SUMMARY

NATIONAL PLAN AND STRATEGY FOR WATER QUALITY

NOVEMBER 1970

FEDERAL WATER QUALITY ADMINISTRATION

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PREFACE

~~This~~ The Program Summary presents the Federal Water Quality Administration's National Plan and Strategy for achieving defined water quality objectives during the decade of the 1970's. This summary revises and updates the preliminary draft Program Memorandum of 12 August 1970.

SECTION 1

OVERVIEW

1.1 INTRODUCTION

1.2 THE MAGNITUDE OF THE PROBLEM

1.3 MISSION, OBJECTIVES, AND GOALS

1.4 PROGRAM STRATEGY

1.5 MAJOR POLICY ISSUES

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SECTION I

OVERVIEW

1.1 INTRODUCTION

The Nation's water resources are fundamental to the well-being of present and future generations. They represent a priceless, renewable, but fragile national asset which can and must be managed to meet all needs--domestic, agricultural, industrial, fish and wildlife, recreational, natural beauty. Adequate quality standards can be achieved, but as the President stated in his Environmental Message, "The tasks that need doing require money, resolve and ingenuity--and they are too big to be done by government alone. They call for fundamentally new philosophies of land, air, and water use, for stricter regulation, for expanded government action, for greater citizen involvement, and for new programs to ensure that government, industry and individuals all are called on to do their share of the job and to pay their share of the cost."

This document outlines the broad national strategy which, if followed, will achieve adequate water quality throughout the Nation during the decade of the 70's. This strategy defines the broad management and planning techniques necessary to direct effectively the programs of the Federal Water Quality Administration, and within the broader framework of a State/Municipal/Federal partnership, to assure timely solution of specific water quality problems on a priority basis. This plan sets forth a comprehensive set of objectives and goals and presents two alternative levels of effort, optimum and proposed, with appropriate recognition of their relative accomplished impacts and effectiveness toward achieving national and regional water quality objectives.

The optimum program describes the steps and resources required for the most effective accomplishment of water quality objectives in the shortest possible time frame. In view of the existing fiscal situation, however, a proposed program is described that provides a lower level of effort which will achieve water quality objectives, but over an increased time period.

The proposed program reflects projected commitments that would result from the 1972 decisions as identified in this program. Subsequent year program planning will be updated to recognize accomplishments, changed physical factors, improved technology, etc., but will remain consistent with the objective of achieving water quality goals.

The national strategy for water quality is necessarily dynamic. The present document provides the base for this strategy and plan and will be periodically updated as further information is obtained and planning activities mature. The Water Quality Standards and River Basin Planning Programs cut across all aspects of pollution control and prevention. These two programs, combined with the President's $10 billion municipal waste construction grant program and an effective management program, provide the main thrust to achieve water quality. In addition, they provide the mechanism for focusing the resources of research, development and demonstration (RD&D), construction, enforcement, technical assistance, and manpower and training on seven major pollution problem areas. These national problems areas are:

Municipal-Sewered Wastes
Industrial and Power Plant Wastes
Agricultural Wastes
Other Urban Wastes
Oil and Hazardous Materials Spills
Mining and Wells
Other Wastes

The resources required for each of these problem areas are broken out as specific program elements to describe how each of these elements (RD&D, enforcement, etc.) are structured as a result of addressing these problems.

1.2 THE MAGNITUDE OF THE PROBLEM

Best estimates of the present level of water quality indicate that 64 percent of the stream miles within the United States, including lake shores and estuaries, are in substantial compliance with existing water quality criteria for the specified levels of water use. It is estimated that only 55 percent of the urban population is served by adequate waste treatment facilities. Some 36 percent, or 44 of the 123 million pounds per day, of biological oxygen demanding wastes discharged by municipalities and industries is not removed by existing treatment.

The population waste load is increasing at a rate of about 1 1/2 percent per year and industrial activities are increasing at about

4 1/2 percent per year. Storm drains in many cities are connected to sanitary sewers resulting in flooding of treatment plants or bypassing of treatment during peak flow periods. Many industrial effluents, some highly toxic, are discharged directly or with inadequate treatment into streams. Agricultural runoff of nutrients and pesticides, and drainage from animal feedlots generally are uncontrolled. Acids and other wastes drain from mines and mining activities without treatment. Preventable serious spills of oil and hazardous materials often occur.

Estimates of the construction costs of facilities to treat all sources of waste (not including R&D, planning, management, manpower, maintenance, and operating costs) total between $33 billion and $100 billion. Table 1 gives a breakdown of these estimates, for the years FY 1971-1976 and for the total target program, in the problem area categories of wastes as follows: Municipal-sewered, other urban, industrial, power, mining, spills, agriculture, and other (including urban sediment runoff and vessel sanitary wastes). Over the next six years municipal-sewered wastes and other urban wastes, such as storm and combined sewers, are the two problems requiring the highest construction costs, followed by mining wastes, industrial wastes, and prevention of spills from oil and hazardous materials.

Not every problem area can be attacked with equal vigor on a population-benefit basis. It is necessary, therefore, to rank problems in order of priority as to relative degree of impact on people. Such an index is presented in Table 1 to reflect the combination of the total waste discharged from the problem sources and the population adversely affected by such discharges. This ranking indicates that the highest cost problem with the greatest impact on the most people is municipal-sewered wastes, followed closely by agricultural and industrial wastes.

Nor can every problem be attacked with equal effectiveness, given the current technology, legal basis for action, and the willingness and financial capability of the responsible persons or agencies to proceed with abatement. Table 1 includes an effectiveness index and a rank ordering of "action effectiveness." Municipal-sewered wastes rank first by a large margin followed by industrial wastes. Agricultural wastes, other urban wastes, other wastes (general), power plant wastes (thermal), mining, and spill prevention follow in that order, primarily due to the technical difficulties involved in their effective treatment. These indices were generated on a river basin by river basin basis and summary regional breakdowns are shown in Table 2.

NEEDS ESTIMATES

Problem Area	Estimated Construction Needs			(in Billions of Dollars)		Indices			
	Potential FY 71-76			Total to Achieve Water Quality		Impact a/		Action Effectiveness b/	
	Low	Middle	High	Low	High	Index	Rank	Index	Rank
Municipal--Sewered	8.7	10.8	13.0	8.7	13.0	52,000	1	44,000	1
Other Urban	6.7	16.3	25.9	13.4	51.8	19,000	5	910	4
Industrial	2.4	3.7	5.2	2.4	5.2	38,000	3	6,000	2
Power	0.8	1.4	2.1	0.8	2.1	3,400	7	460	6
Mining	0.1	2.0	5.0	5.0	15.0	7,000	6	260	7
Spills	1.0	3.0	5.0	1.0	5.0	2,100	8	180	8
Agriculture	0.1	1.0	1.7	0.6	6.8	47,000	2	1,300	3
Other	0.7	0.9	1.1	0.8	2.2	34,000	4	760	5
Total	20.5	39.1	59.0	32.7	101.1	—	—	—	—

a/ Impact Index relates the proportion of waste discharged by the problem sector to total wastes discharged in the basin and most importantly, to the population adversely affected by that discharge. A large relative discharge affecting a large proportion of the basin population results in a high index.

b/ Action Effectiveness Index combines the relative costs of control, effectiveness toward meeting standards availability of technology to meet the need and willingness and ability to proceed. This factor modifies the impact index to show the most effective area in which to move first.

TABLE 1

TABLE 2

SUMMARY OF REGIONAL ANALYSIS ON RELATIVE MAGNITUDE OF POLLUTION PROBLEMS BY MAJOR RIVER BASIN[a/]

PROBLEM AREA	01 Northeast	02 S. Atlantic	03 Southeast	04 Tennessee	05 Ohio	06 Lake Erie	07 U. Miss.	08 L. Great Lakes	09 Missouri	10 Southwest	11 Colorado	12 W. Gulf	13 Pac. Northwest	14 California	15 Great Basin	16 Alaska	17 Hawaii	18 Puerto Rico	19 Virgin Is	National Summary	RANK
IMPACT INDEX b/																					
Municipal	11000	4600	4700	340	6200	3100	9400	9800	2300	2000	460	2800	640	2430	370	25	140	170	2	52000	1
Other Urban	5000	[illegible]	[illegible]	51	2000	170	1400	1500	590	150	22	180	480	300	26	16	6	670	B(3)	19000	5
Industrial	700	2400	4800	350	4600	460	7700	[illegible]	130	2100	46	1700	3100	[illegible]	46	65	120	120	9	39000	3
Power	540	200	120	130	300	6	150	1300	19	8	330	51	170	87	8	B(4)	55	17	B(.09)	3400	7
Agriculture	300	1600	1000	110	[illegible]	720	6200	1900	1300	1700	19000	2200	940	1600	240	15	110	220	B(.06)	49000	2
Mining	7	1400	100	51	590	B(4)	120	1500	2500	260	150	98	110	140	6	5	B(1)	1	0	7000	6
Spills	600	260	85	10	140	B(3)	140	61	220	180	9	33	26	270	2	24	8	1	B(2)	8100	8
Other	590	360	200	38	110	410	440	380	5300	1700	20000	1600	2400	370	150	4	26	1	2	34000	4
ACTION EFFECTIVE INDEX c/																					
Municipal	13000	1500	2600	320	3000	2900	11000	1000	2800	510	200	1600	300	1400	770	12	9	200	1	44000	1
Other Urban	140	36	200	6	63	16	120	98	28	5	2	11	39	130	B(4)	B(5)	B(1)	35	B(.02)	910	4
Industrial	1200	770	500	45	260	260	470	960	470	99	2	31	310	27	2	2	6	9	B(.06)	6000	2
Power	120	15	9	8	69	B(3)	44	120	6	1	18	7	14	24	B(9)	B(5)	3	1	B(.07)	460	6
Agriculture	7	42	39	4	22	7	[illegible]	4	510	26	190	41	20	12	1	B(4)	4	B(3)	B(.02)	1300	3
Mining	B(4)	48	14	4	10	B(.02)	[illegible]	4	170	20	4	4	5	13	B(2)	B(1)	B(.36)	B(1)	0	260	7
Spills	33	[illegible]	8	B(3)	14	B(.01)	9	3	39	6	1	1	1	[illegible]	B(2)	1	B(5)	B(.02)	B(.030)	180	8
Other	37	6	4	2	9	10	9	16	230	36	310	38	42	9	1	B(.08)	1	B(.01)	B(.04)	960	5
INDEX OF TOTAL COMPLIANCE	0.57	0.63	0.97	0.95	0.67	0.71	[illegible]	0.46	0.37	0.75	0.86	0.61	0.74	0.71	0.64	0.52	0.92	0.90	0.90	0.64	

a/ Major Basins as defined for basin planning.

b/ Impact Index relates the proportion of waste discharged by the problem sector to total wastes discharge in the basin and most importantly to the population adversely affected by that discharge. A large relative discharge affecting a large proportion of the basin population results in a high index.

c/ Action Effectiveness Index combines the relative costs of control, effectiveness toward meeting standard availability of technology to meet the need, and willingness and ability to proceed. This factor modifies the impact index to show the most effective area in which to move first.

B Less than or equal to the value shown ( ).

XXXXXXXXXXXXXXXXXXXXX
See the following pages
for greater detail.
XXXXXXXXXXXXXXXXXXXXX

TABLE 2

SUMMARY OF REGIONAL ANALYSIS ON RELATIVE
PROBLEMS BY MAJOR RIVER

PROBLEM AREA	01 Northeast	02 N. Atlantic	03 Southeast	04 Tennessee	05 Ohio	06 Lake Erie	07 U. Miss.	W. Great Lakes	09 Missouri	10 Southwest	11 Colorad
IMPACT INDEX b/											
Municipal	11000	4600	4700	340	4200	3100	9700	2900	2300	2000	460
Other Urban	5000	1700	3700	51	2000	170	1600	1800	550	150	22
Industrial	700	2400	4800	350	4600	480	7700	2000	130	2100	60
Power	540	200	120	130	300	6	150	1300	19	8	330
Agriculture	300	1400	1000	110	190	720	4200	1500	1300	1700	19000
Mining	7	1400	100	51	590	≤(4)	120	1500	2500	260	150
Spills	600	260	85	10	140	≤(3)	140	61	220	180	9
Other	590	360	200	38	110	410	640	380	5300	1700	20000
ATTACK EFFECTIVE INDEX c/											
Municipal	13000	1500	2600	320	3000	2000	11000	[illegible]	2900	510	200
Other Urban	140	35	200	6	43	14	120	56	28	5	2
Industrial	1200	770	920	45	260	200	670	960	470	99	2
Power	120	15	9	8	69	≤(3)	44	120	6	9	19
Agriculture	7	42	39	4	32	7	70	14	530	26	370
Mining	≤(4)	48	14	4	10	≤(02)	5	4	135	28	4
Spills	33	14	8	≤(3)	14	≤(01)	9	3	78	6	1
Other	37	8	4	2	9	10	9	14	230	34	310
INDEX OF TOTAL COMPLIANCE	0.57	0.63	0.97	0.85	0.63	0.71	0.35	0.46	0.37	0.75	0.86

a/ Major Basins as defined for basin planning.

b/ Impact Index relates the proportion of waste discharged by the problem sector to total wastes discharge in the basin and most importantly to the population adversely affected by that discharge. A large relative discharge affecting a large proportion of the basin population results in a high index.

c/ Action Effectiveness Index combines the relative costs of control, effectiveness toward meeting standard availability of technology to meet the need, and willingness and ability to proceed. This factor modifies the impact index to show the most effective area in which to move first.

≤ Less than or equal to the value shown ( ).

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A

TABLE 2

REGIONAL ANALYSIS ON RELATIVE MAGNITUDE OF POLLUTION PROBLEMS BY MAJOR RIVER BASIN[a]

s.	[illegible] W. Great Lakes	09 Missouri	10 Southwest	11 Colorado	12 W. Gulf	13 Pac. Northwest	14 California	15 Great Basin	16 Alaska	17 Hawaii	18 Puerto Rico	19 Virgin Is	National Summary	RANK
	2900	2300	2000	460	2800	440	2400	370	25	140	170	2	52000	1
	1800	550	150	22	380	490	500	26	14	6	670	z(3)	19000	5
	2800	130	2100	60	1700	3100	830	66	65	120	120	2	38000	3
	1300	19	8	330	52	170	87	2	z(4)	55	17	z(09)	3400	7
	1500	1300	1700	19000	2200	940	1600	240	15	110	220	z(06)	47000	2
	1500	2500	260	150	38	110	140	6	5	z(1)	1	0	7000	6
	61	220	180	9	33	26	270	2	24	2	1	z(2)	2100	8
	380	5300	1700	20000	1600	2400	370	150	4	26	1	2	34000	4
	4000	2900	510	200	1600	300	1400	370	12	9	200	1	44000	1
	56	28	[illegible]	2	11	39	130	z(4)	z(6)	z(1)	55	z(02)	910	4
	960	470	99	2	51	310	27	2	2	6	9	z(06)	6000	2
	120	6	3	19	7	14	24	z(3)	z(5)	3	1	z(07)	460	6
	14	530	26	270	41	20	12	1	z(4)	4	z(3)	z(02)	1300	3
	4	135	28	4	4	5	13	z(2)	z(1)	z(06)	z(1)	0	260	7
	[illegible]	78	6	1	1	1	10	z(2)	1	z(5)	z(02)	z(020)	180	8
	14	230	34	310	38	42	9	1	z(08)	1	z(01)	z(04)	760	5
	0.46	0.37	0.75	0.86	0.61	0.74	0.71	0.64	0.82	0.93	0.90	0.90	0.64	

and most importantly
the basin population

ty of technology to
ctive area in which

B

When the municipal and industrial waste problems are considered in terms of pollution, as opposed to cost magnitude, the impact of the industrial waste problem is more apparent. Table 3 summarizes the amount of BOD (Biochemical Oxygen Demand) per day from different types of municipal and industrial sources together with the treatment capacity for each type. Industries generate 80.7 percent of the BOD load and account for 84.7 percent of BOD reaching streams. On a pollution source basis, using only BOD as the measure, industrial wastes contribute far more pollution than municipal wastes. This does not consider other types of industrial pollution which may be even more serious.

The most effective means to achieve progress in reaching water quality goals and to benefit the greatest number of people, is through programs to attack municipal-sewered and industrial wastes.

1.3 MISSION, OBJECTIVES, AND GOALS

1.3.1 Mission

The Federal Water Quality Administration derives its basic public mandate from policies contained in the Federal Water Pollution Control Act, as amended, and the National Environmental Policy Act of 1969. Consistent with these policies the Federal Water Quality Administration's mission is:

(1) To prevent further pollution of the Nation's water resources by preserving existing high quality waters for future generations and maintaining achieved levels of water quality for presently defined uses.

(2) To reverse the present degradation of the Nation's waters and to enhance the value of water and related resources by abating pollution and by managing waste-bearing waters for beneficial reuse.

(3) To contribute to a coordinated and long-range national program for the preservation of a balanced environment.

The present and future utility or value of our water resources must be systematically identified. The properties that define the utility and value of a water resource are its quantity, quality, and accessibility. The maximum utility and value of our water resources are achieved through the control of these properties. Pollution is any impairment of the quality of water resources which interferes with maximum utility or value.

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COMPONENTS OF NATIONAL
WASTE DISCHARGE, 1968

WASTE SOURCE	MILLION POUNDS BOD_5/DAY				PRESENT PERCENT REDUCED BY TREATMENT
I. DISCHARGE POINT	TOTAL	%	DISCHARGED	%	
METROPOLITAN POPULATION	18.3	14.9	5.2	11.9	71.6
NON-METROPOLITAN POPULATION	5.4	4.4	1.5	3.4	72.2
SEPARATELY DISCHARGING INDUSTRIES*	80.0	65.3	30.7	70.3	61.6
INDUSTRIES DISCHARGING THROUGH METROPOLITAN PLANTS	18.2	14.8	5.9	13.5	67.6
INDUSTRIES DISCHARGING THROUGH NON-METROPOLITAN PLANTS	0.7	0.6	0.4	0.9	42.9
TOTAL	122.6	100.0	43.7	100.0	64.4
II. POINT OF ORIGIN					
INDUSTRIAL TOTAL	98.9	80.7	37.0	84.7	62.6
POPULATION TOTAL	23.7	19.3	6.7	15.3	71.7
TOTAL	122.6	100.0	43.7	100.0	64.4

---

*Assumes 300 day average operating year.

Note: Industrial wastes enter our streams through municipal as well as industrial discharges as shown in I. More importantly, by point of origin, shown in II, industrial BOD contributions account totally for 80.7% of BOD generated and 84.7% of BOD discharged. Overall effectiveness of industrial waste treatment is well below that of municipal, and because of the greater relative volume of industrial wastes, total national waste treatment effectiveness falls well below the municipal average.

TABLE 3

1.3.2 Objectives

The objectives of a National Clean Water Program for the decade of the seventies is to restore the Nation's water environment to a healthy and stable state and to provide adequate and protected water resources for the needs and the future well-being of the Nation's population.

The objectives of the proposed five-year program ending in 1976 are to establish water quality standards, including effluent requirements to be met in accordance with individual time schedules, for the waters of the Nation, including navigable, coastal and ground water; to achieve compliance with the specified effluent requirements for all industrial and municipal discharges.

The long-range 1980 objective of the proposed program is to manage and control all other sources of pollution. The optimum program will achieve most water goals by the end of 1976. In addition, the optimum program will provide by 1980 the technology and institutions for the complete recycle of waste and the reuse of renovated waste waters.

1.3.3 Achievable Goals

The following milestones are listed to meet overall program objectives in a cost-effective manner at an optimum and realistic level of effort. Dates shown here are calendar dates.

> In 1970, to implement tight regulations to identify and prevent contamination of water resources by those hazardous materials which endanger human health and the environment.
>
> In 1970, to achieve total participation with the Council on Environmental Quality in pursuing the many and varied interagency facets of a concerted Federal effort to protect and enhance the quality of the Nation's environment, to sustain and enrich human life.
>
> In 1970, to initiate a program to prevent the pollution of the ocean environment in consonance with policies developed by the Council on Environmental Quality and international agreements.
>
> In 1971, to have operational information systems and a program management capability to assess continually the status of program accomplishments and to direct resources effectively toward goals.

In 1971, to have a fully operational capability to respond to and clean up oil and hazardous material spills and, by mid-1973, to have a fully operational preventive program for oil and hazardous materials.

In 1972, to establish water quality standards for all coastal, navigable and ground waters adequate to meet the projected public demands for the year 2000.

In 1972, to establish effluent requirements as an element of water quality standards for all point waste sources to facilitate compliance with water quality criteria and basin plans.

In 1972, to abate pollution caused by all Federal installations and to continue to provide ongoing assistance to other Federal agencies in protecting and enhancing the quality of the environment pursuant to Executive Orders 11507 and 11514.

In 1972, to complete a program to control heat and radiation discharges from power production plants in conjunction with other Federal agencies and programs and policies.

In 1972, in conjunction with completed basin plans, to devise programs to control storm water and other urban runoff.

In 1972, to begin the development, through assistance to the States, of implementable estuarine and coastal zone management plans.

In 1973, to complete required implementable water basin plans to be certified by the States and water basin commissions and to be accepted by FWQA.

In 1973, to complete the control of pesticide pollution of the water environment.

In 1973, to initiate a program to control salinity pollution problems.

In 1973, to have initiated programs to control the sediment runoff from agricultural, urban, and public lands.

In 1973, to initiate programs to control nutrients from agricultural drainage.

In 1974, to have a fully operational program in conjunction with basin plans to control subsurface waste disposal practices and to preserve the quality of the Nation's ground water resources.

In 1974, to complete development of an effective onsite disposal system for use in individual homes and small communities.

In 1974, to complete a detailed system analysis of plumbing-sewer systems with the objective of obtaining a 90 percent flow reduction.

In 1974, to have developed the control technology and initiated the regulatory and construction programs to control water pollution from active mines, and by 1990 to have achieved full control of these activities in abandoned mines.

In 1976, to achieve full compliance with effluent requirements for industrial wastes, and to maintain this level of compliance on an ongoing basis through surveillance, enforcement, or alternative methods to be determined.

In 1976, to achieve compliance with effluent requirements for municipal wastes and to maintain this level of compliance on an ongoing basis through surveillance, enforcement, and public utility long-term financing arrangements.

In 1976, to achieve a 90 percent reduction in the shellfish areas closed to harvesting because of pollution.

In 1976, to achieve full compliance with effluent requirements for animal feedlot and agri-business operations.

In 1976, in conjunction with completed basin plans, to control 50 percent of combined sewer discharges.

In 1976, to achieve through joint effort with the States and Coast Guard full control of the sanitary wastes and refuse from water craft on navigable waters.

1.3.4 Federal Water Quality Administration Priorities

The previously stated goals have been structured in the following order of priorities to meet the ten-year objectives of the National Clean Water Program. These priorities reflect the necessity for adequate management, planning and standard setting activities as an essential prerequisite to achieving long-range objectives within budgetary constraints. Priorities are listed within four general categories in descending value:

Essential
High Impact
Medium Impact
Deferred Impact

The priorities assigned to the goals by these categories are shown in Table 4.

1.4 PROGRAM STRATEGY

Dual paths are proposed in the strategy for the attainment of water quality goals (Figure 1). The first of the paths deals with interstate and coastal waters, presently covered by existing water quality standards, and the second deals with all other national waters.

Existing Federal legislation provides an imperfect mechanism for attaining water quality goals in interstate and certain coastal areas. Additional legislation is needed to facilitate enforcement activities in these waters. In addition, legislative authority should be extended to all other national waters, including ground waters, in order to attain a truly national goal. Alternative pathways based on voluntary compliance exist, but would be unlikely to attain goals within the prescribed time period. In each case, the overall strategy reflects fully the concepts of State/Federal coordination prescribed by the Federal Water Pollution Control Act, as amended.

The water quality standards are the first key to progress. Properly used, they identify uses and criteria, render a timetable for corrective measures,and provide a mechanism for implementation and enforcement. The development of effective, reliable river basin pollution abatement and prevention plans is the second essential step in the attainment of goals. These plans relate the sources of pollution and the hydrographic characteristics of the basin to the applicable water quality standards and provide a visible community framework for control.

These plans recognize the varying hydrographic conditions and inherent differences in pollution types and provide the cost-effective, timely, corrective, and preventive action requirements for each of the 1,300 river basins and 700 estuarine systems comprising the water resources of the United States.

PRIORITIES OF GOALS

I ESSENTIAL

- TOTAL PARTICIPATION IN FEDERAL ENVIRONMENTAL EFFORTS (1970)
- INITIATION OF OCEAN POLLUTION PREVENTION PROGRAM (1970)
- OPERATIVE INFORMATION SYSTEMS AND PROGRAM MANAGEMENT CAPABILITY (1971)
- WATER QUALITY STANDARDS BASED ON YEAR 2000 (1972)
- EFFLUENT REQUIREMENTS FOR POINT WASTE SOURCES (1972)
- BEGINNING ESTUARINE AND COASTAL ZONE MANAGEMENT PLANS (1972)
- CERTIFIED BASIN PLANS FOR ALL WATER BASINS REQUIRING DETAILED, IMPLEMENTABLE PLANS (1973)
- FULL COMPLIANCE WITH MUNICIPAL WASTE EFFLUENT REQUIREMENTS (1976)

II HIGH IMPACT

- IMPLEMENTATION OF STRICT HAZARDOUS MATERIALS REGULATIONS (1970)
- RESPONSE CAPABILITY FOR OIL AND HAZARDOUS MATERIAL SPILLS (1971); PREVENTIVE PROGRAM (MID-1973)
- ABATEMENT OF FEDERAL INSTALLATIONS' POLLUTION (1972)
- CONTROLS FOR POWER PRODUCTION PLANTS HEAT AND RADIATION DISCHARGES (1972)
- CONTROL OF PESTICIDES POLLUTION IN WATER (1972)
- DEVELOPMENT OF SMALL SCALE, ON-SITE DISPOSAL SYSTEMS (1974)
- FULL COMPLIANCE WITH INDUSTRIAL WASTE EFFLUENT REQUIREMENTS (1976)
- 90% REDUCTION IN CLOSED SHELL FISHING AREAS (1976)

III MEDIUM IMPACT

- CONTROL OF SUBSURFACE WASTE DISPOSAL (1974)
- DETAILED SYSTEM ANALYSIS OF PLUMBING-SEWER SYSTEMS, TOWARD 90% FLOW REDUCTION (1974)
- FULL COMPLIANCE WITH AGRI-BUSINESS EFFLUENT REQUIREMENTS (1976)
- CONTROL OF SANITARY WASTES AND REFUSE FROM WATERCRAFT (1976)
- CONTROL OF 50% OF COMBINED SEWER DISCHARGES (1976)

IV DEFERRED IMPACT

- PLAN TO CONTROL STORM WATER AND OTHER URBAN RUNOFF (1972)
- INITIATION OF SALINITY POLLUTION CONTROL PROGRAM (1973)
- INITIATION OF SEDIMENT RUNOFF CONTROL PROGRAMS (1973)
- INITIATION OF PROGRAM FOR CONTROL OF NUTRIENTS FROM AGRICULTURAL RUNOFF (1973)
- TECHNOLOGY FOR CONTROL AND INITIATION OF MINING POLLUTION CONTROL PROGRAMS (1974); FULL POLLUTION CONTROL AT OPERATING MINES (1990)

TABLE 4

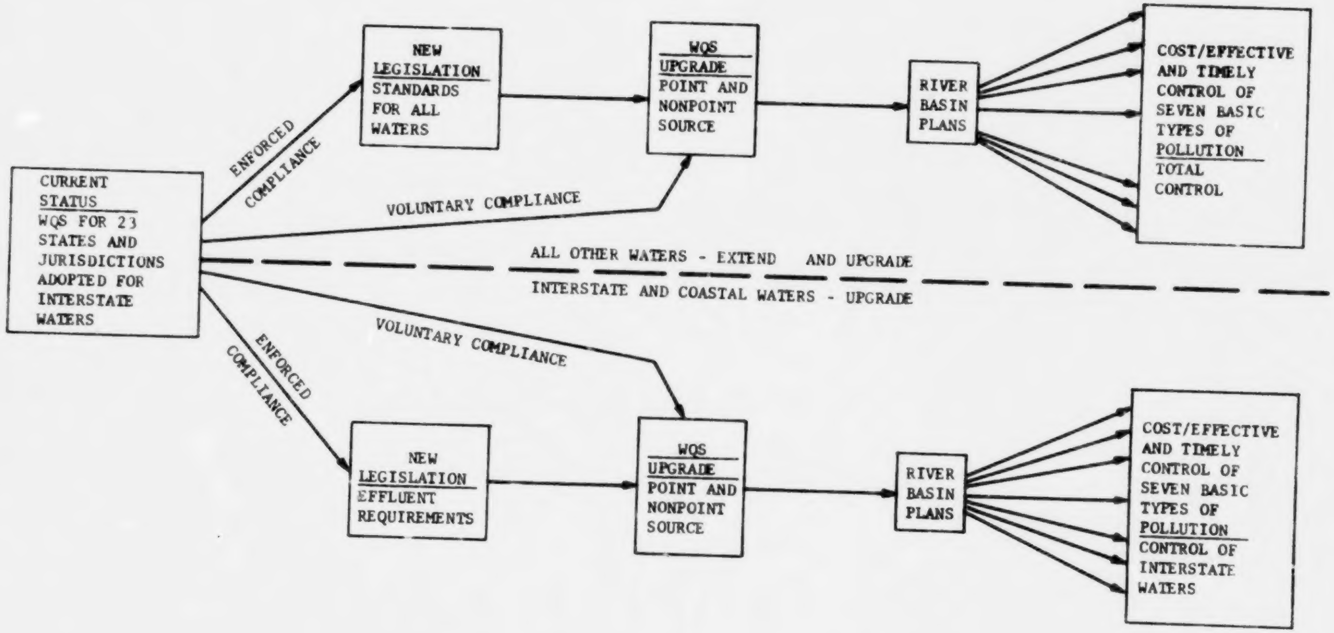

CURRENT STATUS
WQS FOR 23 STATES AND JURISDICTIONS ADOPTED FOR INTERSTATE WATERS
ENFORCED COMPLIANCE
NEW LEGISLATION
STANDARDS FOR ALL WATERS
WQS UPGRADE
POINT AND NONPOINT SOURCE
RIVER BASIN PLANS
COST/EFFECTIVE AND TIMELY CONTROL OF SEVEN BASIC TYPES OF POLLUTION
TOTAL CONTROL
VOLUNTARY COMPLIANCE
ALL OTHER WATERS - EXTEND AND UPGRADE
INTERSTATE AND COASTAL WATERS - UPGRADE
VOLUNTARY COMPLIANCE
ENFORCED COMPLIANCE
NEW LEGISLATION
EFFLUENT REQUIREMENTS
WQS UPGRADE
POINT AND NONPOINT SOURCE
RIVER BASIN PLANS
COST/EFFECTIVE AND TIMELY CONTROL OF SEVEN BASIC TYPES OF POLLUTION
CONTROL OF INTERSTATE WATERS

FIGURE 1
STRATEGIC PATHS TO NATIONAL WATER QUALITY GOALS
FRAMEWORK FOR STATE/FEDERAL COOPERATION

In summary, water quality standards form the basis for the control and abatement actions to be implemented in each water basin. Resulting basin plans provide the means of focusing the proper mix of new technology, facility construction, enforcement and management of resources in the most cost-effective manner.

1.4.1 Strategic Actions

The overall strategy encompasses six major strategic action concepts. These concepts include:

(1) Timephasing of three major construction programs (Municipal, Other Urban, and Mining Wastes) to avoid cumulative economic impact at Federal, State, and community levels as shown in Figure 2.

(2) The establishment of priorities to direct resources initially into those geographic areas with maximum population impact and into pollution source areas in which corrective technology is available.

(3) Critical timephasing for acquisition of scientific information in advance of major corrective and construction programs and the deferral of low priority needs.

(4) The application of cost-effective concepts to all program elements to assure maximum utilization of new technologies and institutional opportunities.

(5) The development and recommendation of supportive legislation in such areas as water resources development, agricultural assistance programs, and abandoned mine restoration.

(6) The involvement of the citizen, old and young, to the maximum extent possible in programs to reclaim, preserve and protect the environment.

1.4.2 Strategic Elements

The proposed programs provide an articulated approach to the management of the seven principal waste types, i.e. municipal, industrial, agricultural, other urban, oil and hazardous material spills, mining and other. FWQA is developing technologies and institutional procedures for abating and preventing pollution in each of these national problem areas. These programs are tailored to identify technical, administrative, legislative, and financial

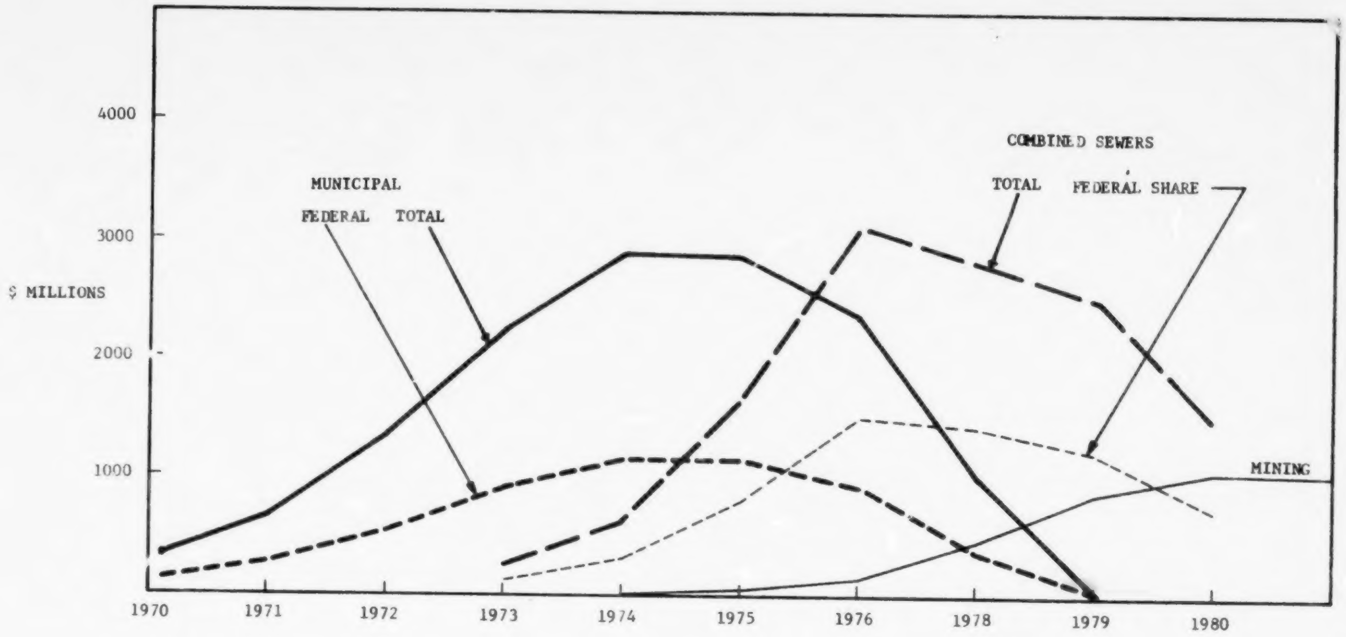


FIGURE 2
CAPITAL EXPENDITURES PROGRAMMING FOR CORRECTIVE ACTION

requirements for each problem area, and develop a schedule of interim objectives leading to the control of pollution from each source. The overall strategy is to assure that the necessary resources and technology for controlling water quality are available in accordance with an established program containing a firm time schedule.

Strategic elements in the overall plan include:

(1) Actions to assure adoption of federally-approved water quality standards by all States and other Federal jurisdictions, followed by periodic upgrading of the standards.

(2) Actions to encourage States to develop implementable plans to close the gap between existing levels of water quality and those required by water quality standards by:

- Increasing Federal and State emphasis on good planning for river basins and regional/metro areas.
- Requiring that federally-subsidized construction projects conform with approved water quality plans.
- Assuring that the priorities established in State program plans (one-year and five-year lists) are consistent with the schedules contained in approved basin or regional/metro water quality plans.

(3) Annual, qualified, objective analysis of each State program to identify strengths and weaknesses, activeness of legislative base, inactivity of funding, and successes as measured by progress in attaining water pollution control goals.

1.4.3 Critical Path

In view of the complex program and responsibility interactions, the total effort must be planned and programmed within a critical path concept which will assure that all actions are fully and effectively implemented and coordinated. An optimum milestone program capable of achieving national and regional objectives is set forth in Figure 3. This reflects the manner in which standards, plans, research, management, and other considerations must interact. This schedule assumes no constraints on resources, and is restricted only by the physical limitations of time for construction and technological innovation. Major milestones of each element of the optimum program are indicated and estimated dates given for 100 percent compliance with the water quality and effluent standards.

The proposed program is also shown in critical path format in Figure 4. In this case the same program elements and milestones are shown, but the projected effects of the lower level of achievement of goals are shown in terms of an increased time of accomplishment.

A comparison of the relative achievement of goals is shown in Figure 5.

1.5 MAJOR POLICY ISSUES

A number of major policy issues must be considered. These are summarized as follows:

Basin Planning - determining and securing the Federal/State and local funding needed to develop the implementable river basin, metropolitan and regional plans which are necessary for effective program management and cost-effective construction.

Operator Training - determining the most effective means of assuring a sufficient supply of trained personnel to operate municipal waste treatment facilities.

Reassessment of Construction Grant Program - re-evaluating the Nation's municipal waste treatment facility requirements and determining a course of Federal action following completion of the President's $10 billion current program.

Combined and Storm Water Sewer Discharges - determining the role of the Federal Government in assisting State and local agencies to control combined and storm water sewer discharges.

Water Quality Standards - legislative action to:

- Extend standards to all navigable and ground waters.
- Permit direct Federal enforcement action on all waters when a violation of State/Federal standards occurs.
- Extend standards to the contiguous zones of coastal waters.
- Add effluent requirements to standards.

- Adopt completed basin plans as the implementation plan of water quality standards.

- Re-evaluate use levels in light of water resource requirements for the future.

- Encourage State and local responsibility for compliance with standards through effective use of Federal assistance and enforcement.

- Determine the degree of certainty of information required to enforce standards legally in a cost-effective program.

- Establish an aggressive program to assure adequate control and management of high quality ground water.

Research, Development and Demonstration - maximizing the effectiveness of meeting scientific information requirements in a goal-directed, cost-effective manner.

- Realigning RD&D priorities in light of the above strategy.

- Ensuring proper mission of federally-sponsored research in the industrial sector and alternative means of carrying out programs to control industrial waste pollution.

- Evaluating the water quality requirements research program and assessing the need for additional laboratory facilities.

- Providing a mechanism for rapid and complete transfer of technology from research to user.

Industrial Sewer Outfalls - transferring responsibility for prescribing water quality regulations for industrial sewer outfalls on navigable waters from Corps of Engineers to FWQA.

Refuse Act of 1899 - transferring jurisdiction for enforcement of the Refuse Act of 1899 from Corps of Engineers to FWQA.

Estuarine Management - establishing a national estuarine management system.

Federal Lands - establishing FWQA responsibility, in conjunction with the Department of the Interior, for control of pollution on public lands.

Vessel Standards - determining the role with U. S. Coast Guard in spills, hazardous materials, incident, and vessel wastes as set forth in the Environmental Quality Act of 1970.

Centers of Excellence - establishing centers of excellence for long term investigation in all environmental sciences; and determining appropriate roles for the academic and private industry sectors.

National Environmental Library - evaluating needs and benefits associated with a specialized library resource, equivalent to the National Library of Medicine.

Agricultural Wastes - determining institutional and economics alternatives for controlling agricultural sources of pollution (e.g., subsidies to farmers); assessing feasibility of assigning water pollution damages caused by pesticides and other agricultural chemicals to the users or suppliers of such materials.

Hazardous Materials - defining "hazardous materials" in a precise, workable manner related to the effects on water quality.

Combining Industrial-Municipal Treatment - determining the extent of Federal support and participation in the control of wastes in which industrial wastes are combined with municipal wastes.

Oil and Mine Wastes - determining extent of Federal participation in controlling wastes from mines and wells.

Dredging - determining relationship and division of responsibilities between FWQA and other Federal agencies in regard to dredging practices on spoil disposal.

Coordination with Water Resources Council - FWQA must arrange for effective participation in the Water Resources Council.

1.6 LEGAL CONSTRAINTS AND LIMITATIONS

There are important constraints which must be considered:

(1) The proof of noncompliance with standards must be supported by information which will be accepted by the courts. This information usually includes such elements as expert testimony, scientific evidence, and data concerning the violation. A study to determine the extent of information requirements for enforcement will be made during 1971.

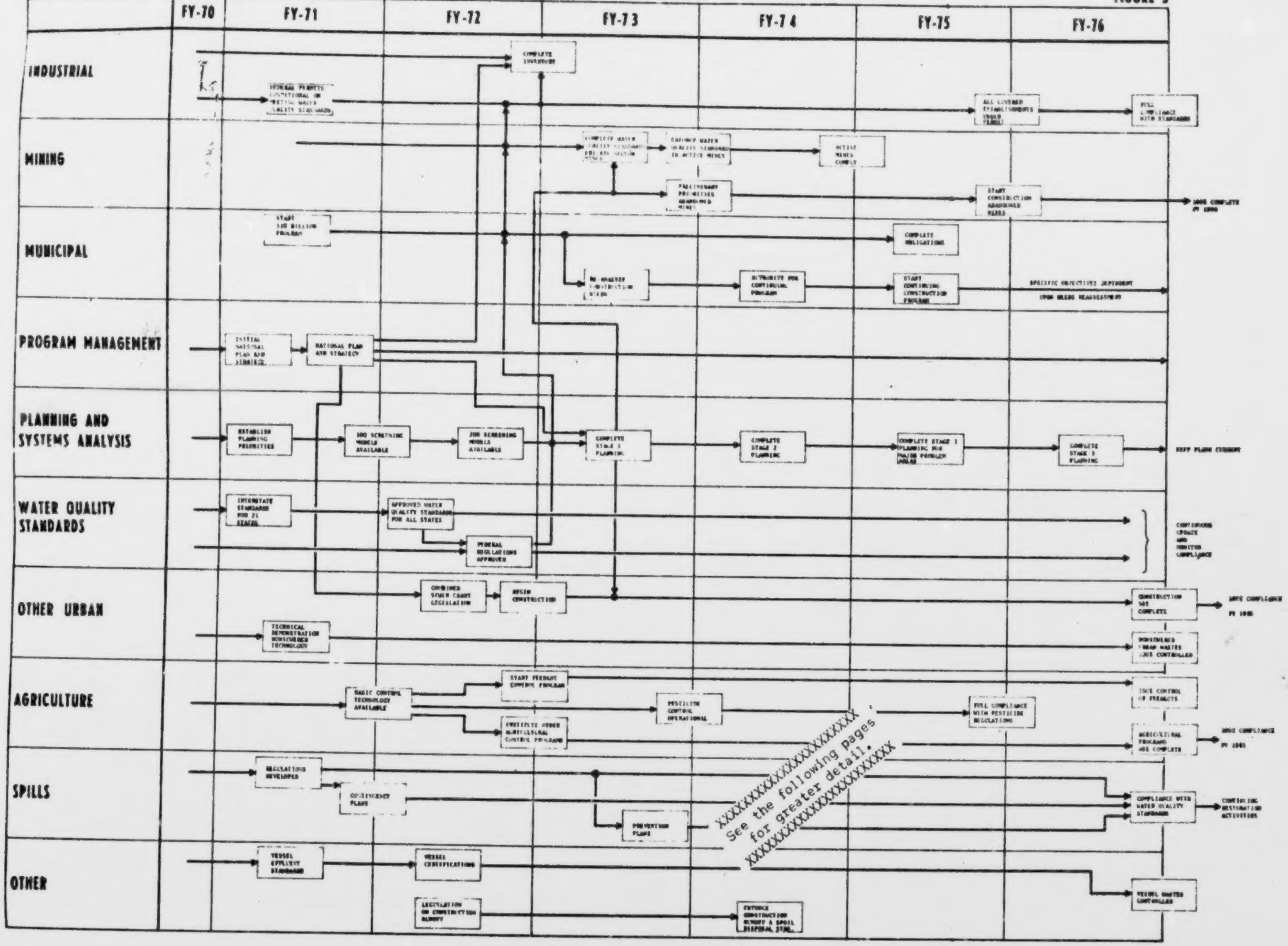
(2) The present legislation restricts FWQA activities within areas of State jurisdiction. There are overriding reasons, however, for the legislation to be amended to permit FWQA to have a greater impact. The proposed strategy as shown in Figure 1 recognizes these limitations and provides the means for addressing them.

Absence of precise effluent limitations makes enforcement of the water quality standards difficult in metropolitan areas. Precise effluent limits would permit the specification of the permissible discharges for any point source of waste.

Resource and program deficiencies in many States require flexible Federal programs which can be tailored to each State's clean water needs and its organic accomplishment capabilities.

OVERALL MILESTONES
OPTIMUM PROGRAM

FIGURE 3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PROGRAM MANAGEMENT
PLANNING AND SYSTEMS ANALYSIS
WATER QUALITY STANDARDS
OTHER URBAN
AGRICULTURE
SPILLS
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FEDERAL PERMITS CONDITIONAL ON MEETING WATER QUALITY STANDARDS
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ENFORCE WATER QUALITY STANDARDS IN ACTIVE MINES
ACTIVE MINES COMPLY
PRELIMINARY PRIORITIES ABANDONED MINES
START CONSTRUCTION ABANDONED MINES
100% COMPLETE FY 1980
START $10 BILLION PROGRAM
COMPLETE OBLIGATIONS
RE ANALYZE CONSTRUCTION NEEDS
AUTHORITY FOR CONTINUING PROGRAM
START CONTINUING CONSTRUCTION PROGRAM
SPECIFIC OBJECTIVES DEPENDENT UPON NEEDS REASSESSMENT
INITIAL NATIONAL PLAN AND STRATEGY
NATIONAL PLAN AND STRATEGY
ESTABLISH PLANNING PRIORITIES
100 SCREENING MODELS AVAILABLE
200 SCREENING MODELS AVAILABLE
COMPLETE STAGE 1 PLANNING
COMPLETE STAGE 2 PLANNING
COMPLETE STAGE 3 PLANNING FOR MAJOR PROBLEM AREAS
COMPLETE STAGE 3 PLANNING
KEEP PLANS CURRENT
INTERSTATE STANDARDS FOR 21 STATES
APPROVED WATER QUALITY STANDARDS FOR ALL STATES
FEDERAL REGULATIONS APPROVED
CONTINUOUS UPDATE AND MONITOR COMPLIANCE
COMBINED SEWER CONST LEGISLATION
BEGIN CONSTRUCTION
CONSTRUCTION 50% COMPLETE
100% COMPLIANCE FY 1980
TECHNICAL DEMONSTRATION NONSEWERED TECHNOLOGY
NONSEWERED URBAN WASTES 100% CONTROLLED
BASIC CONTROL TECHNOLOGY AVAILABLE
START FEEDLOT CONTROL PROGRAM
INSTITUTE OTHER AGRICULTURAL CONTROL PROGRAMS
PESTICIDE CONTROL OPERATIONAL
FULL COMPLIANCE WITH PESTICIDE REGULATIONS
100% CONTROL OF FEEDLOTS
AGRICULTURAL PROGRAMS 40% COMPLETE
100% COMPLIANCE FY 1985
REGULATIONS DEVELOPED
CONTINGENCY PLANS
PREVENTION PLANS
COMPLIANCE WITH WATER QUALITY STANDARDS
CONTINUING RESTORATION ACTIVITIES
VESSEL EFFLUENT STANDARDS
VESSEL CERTIFICATIONS
VESSEL WASTES CONTROLLED
LEGISLATION ON CONSTRUCTION RUNOFF
ENFORCE CONSTRUCTION RUNOFF & SPOIL DISPOSAL STDS.

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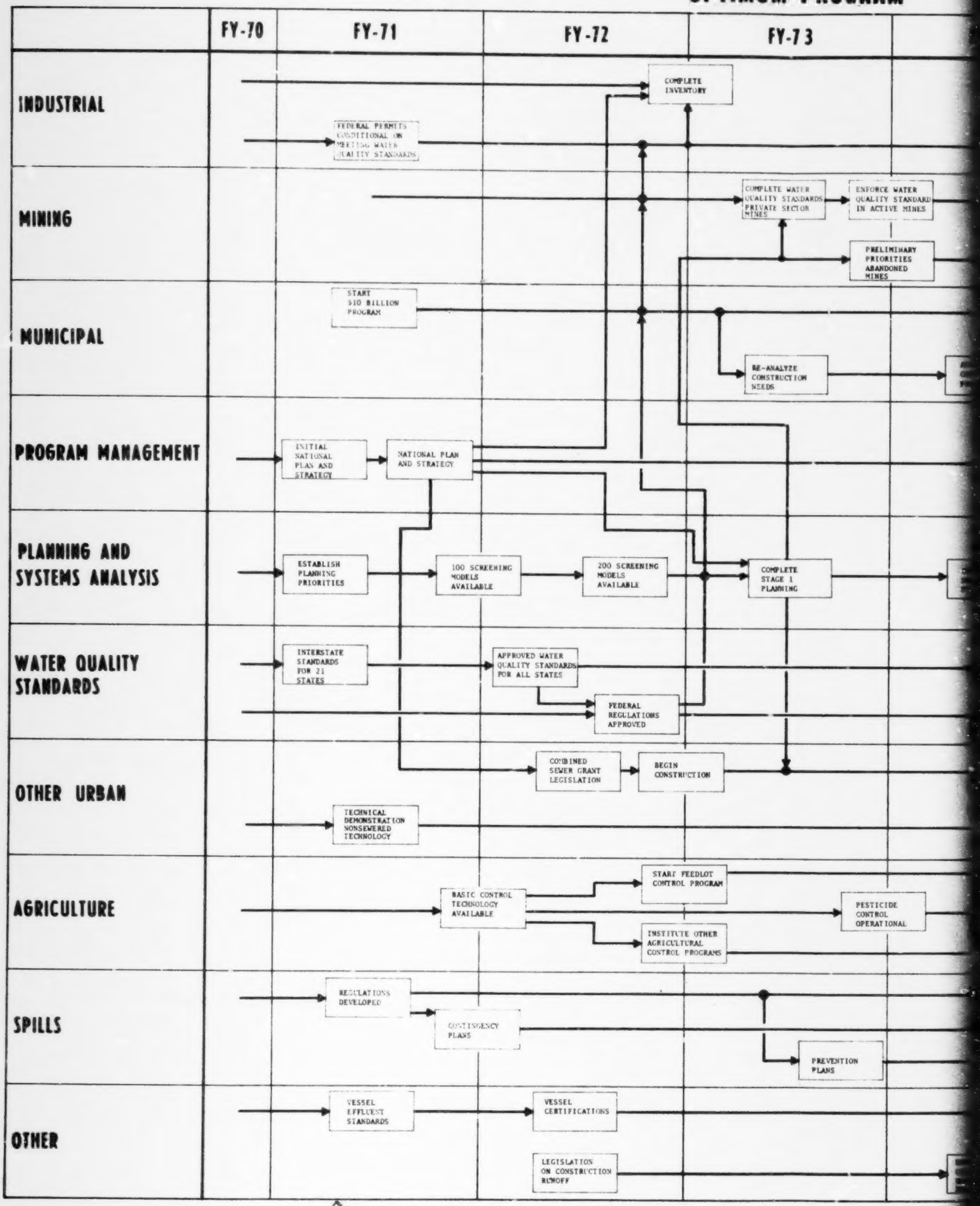
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PLANNING AND SYSTEMS ANALYSIS
WATER QUALITY STANDARDS
OTHER URBAN
AGRICULTURE
SPILLS
OTHER
COMPLETE INVENTORY
FEDERAL PERMITS CONDITIONAL ON MEETING WATER QUALITY STANDARDS
COMPLETE WATER QUALITY STANDARDS PRIVATE SECTOR MINES
ENFORCE WATER QUALITY STANDARD IN ACTIVE MINES
PRELIMINARY PRIORITIES ABANDONED MINES
START $10 BILLION PROGRAM
RE-ANALYZE CONSTRUCTION NEEDS
INITIAL NATIONAL PLAN AND STRATEGY
NATIONAL PLAN AND STRATEGY
ESTABLISH PLANNING PRIORITIES
100 SCREENING MODELS AVAILABLE
200 SCREENING MODELS AVAILABLE
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INTERSTATE STANDARDS FOR 21 STATES
APPROVED WATER QUALITY STANDARDS FOR ALL STATES
FEDERAL REGULATIONS APPROVED
COMBINED SEWER GRANT LEGISLATION
BEGIN CONSTRUCTION
TECHNICAL DEMONSTRATION NONSEWERED TECHNOLOGY
BASIC CONTROL TECHNOLOGY AVAILABLE
START FEEDLOT CONTROL PROGRAM
INSTITUTE OTHER AGRICULTURAL CONTROL PROGRAMS
PESTICIDE CONTROL OPERATIONAL
REGULATIONS DEVELOPED
CONTINGENCY PLANS
PREVENTION PLANS
VESSEL EFFLUENT STANDARDS
VESSEL CERTIFICATIONS
LEGISLATION ON CONSTRUCTION RUNOFF

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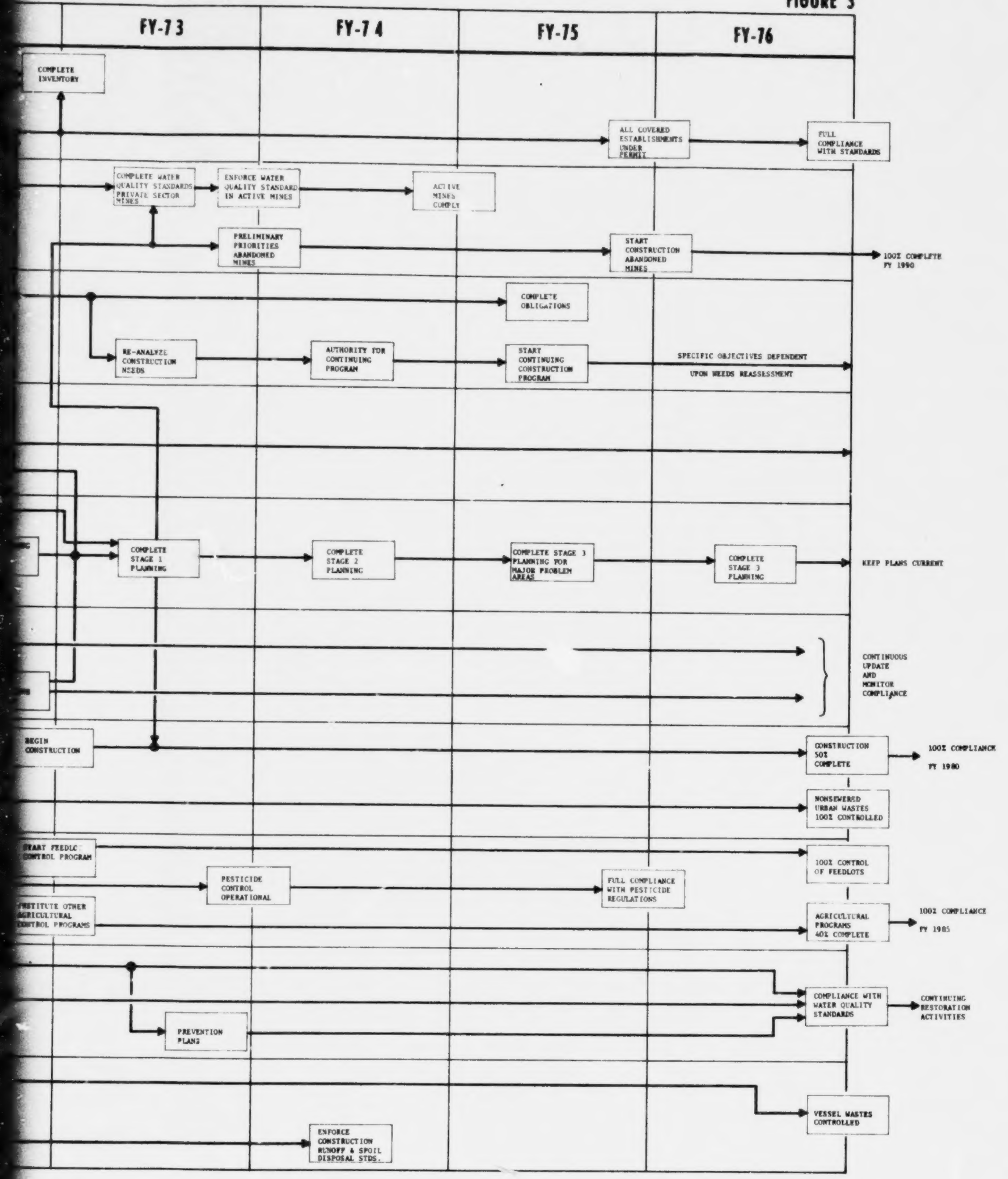
OVERALL MILESTONES
OPTIMUM PROGRAM

FIGURE 3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ALL COVERED ESTABLISHMENTS UNDER PERMIT
FULL COMPLIANCE WITH STANDARDS
COMPLETE WATER QUALITY STANDARDS PRIVATE SECTOR MINES
ENFORCE WATER QUALITY STANDARD IN ACTIVE MINES
ACTIVE MINES COMPLY
PRELIMINARY PRIORITIES ABANDONED MINES
START CONSTRUCTION ABANDONED MINES
100% COMPLETE FY 1990
COMPLETE OBLIGATIONS
RE-ANALYZE CONSTRUCTION NEEDS
AUTHORITY FOR CONTINUING PROGRAM
START CONTINUING CONSTRUCTION PROGRAM
SPECIFIC OBJECTIVES DEPENDENT UPON NEEDS REASSESSMENT
COMPLETE STAGE 1 PLANNING
COMPLETE STAGE 2 PLANNING
COMPLETE STAGE 3 PLANNING FOR MAJOR PROBLEM AREAS
COMPLETE STAGE 3 PLANNING
KEEP PLANS CURRENT
CONTINUOUS UPDATE AND MONITOR COMPLIANCE
BEGIN CONSTRUCTION
CONSTRUCTION 50% COMPLETE
100% COMPLIANCE FY 1980
NONSEWERED URBAN WASTES 100% CONTROLLED
START FEEDLC
CONTROL PROGRAM
100% CONTROL OF FEEDLOTS
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AGRICULTURAL PROGRAMS 40% COMPLETE
100% COMPLIANCE FY 1985
PREVENTION PLANS
COMPLIANCE WITH WATER QUALITY STANDARDS
CONTINUING RESTORATION ACTIVITIES
VESSEL WASTES CONTROLLED
ENFORCE CONSTRUCTION RUNOFF & SPOIL DISPOSAL STDS.

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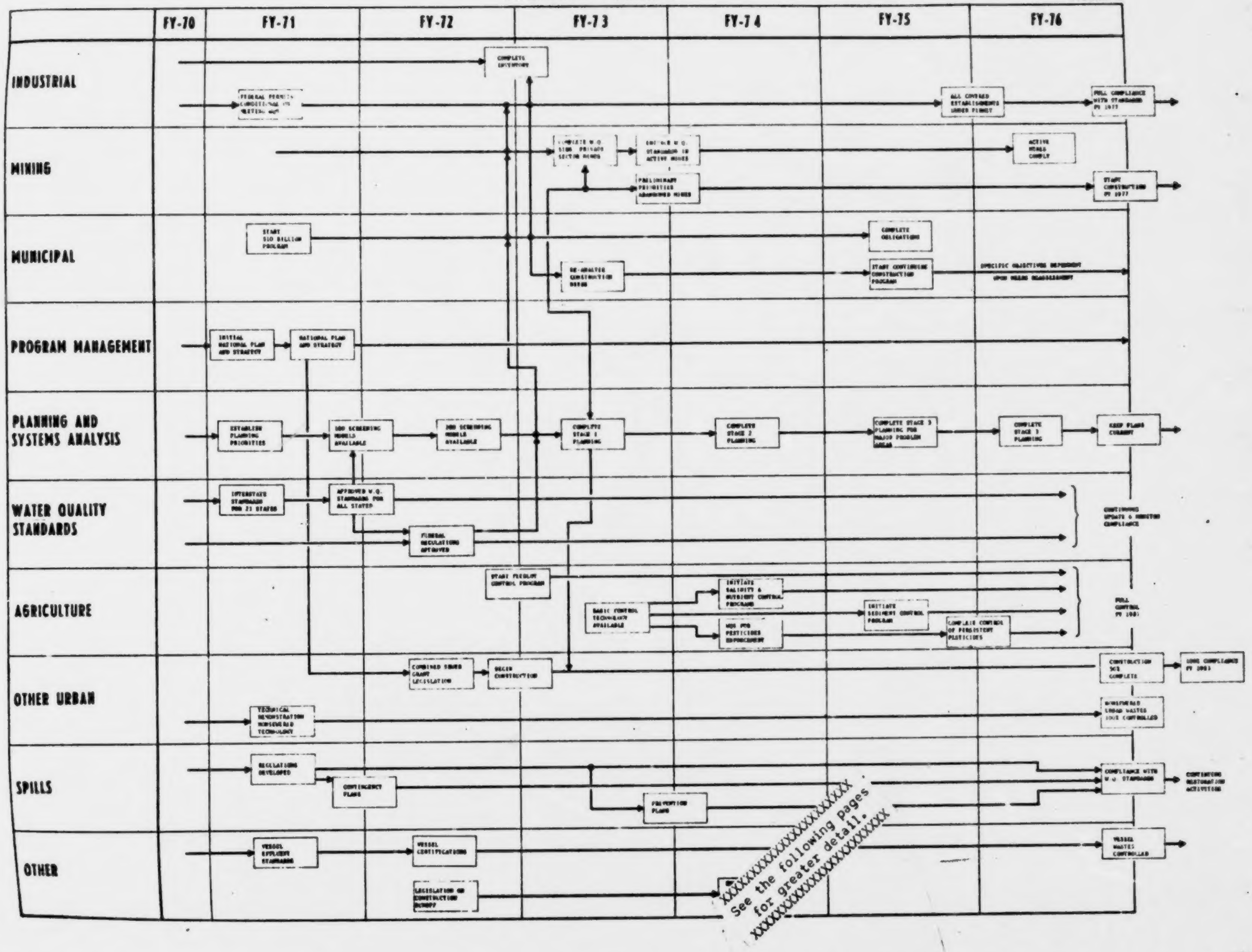
OVERALL MILESTONES
PROPOSED PROGRAM

FIGURE 4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FEDERAL PERMITS CONDITIONAL ON MEETING WQS
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MINING
COMPLETE W.Q. STDS. PRIVATE SECTOR MINES
ENFORCE W.Q. STANDARDS IN ACTIVE MINES
PRELIMINARY PRIORITIES ABANDONED MINES
ACTIVE MINES COMPLY
START CONSTRUCTION FY 1977
MUNICIPAL
START $10 BILLION PROGRAM
RE-ANALYZE CONSTRUCTION NEEDS
COMPLETE OBLIGATIONS
START CONTINUING CONSTRUCTION PROGRAM
SPECIFIC OBJECTIVES DEPENDENT UPON NEEDS REASSESSMENT
PROGRAM MANAGEMENT
INITIAL NATIONAL PLAN AND STRATEGY
NATIONAL PLAN AND STRATEGY
PLANNING AND SYSTEMS ANALYSIS
ESTABLISH PLANNING PRIORITIES
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300 SCREENING MODELS AVAILABLE
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COMPLETE STAGE 2 PLANNING
COMPLETE STAGE 3 PLANNING FOR MAJOR PROBLEM AREAS
COMPLETE STAGE 3 PLANNING
KEEP PLANS CURRENT
WATER QUALITY STANDARDS
INTERSTATE STANDARDS FOR 21 STATES
APPROVED W.Q. STANDARDS FOR ALL STATES
FEDERAL REGULATIONS APPROVED
CONTINUOUS UPDATE & MONITOR COMPLIANCE
AGRICULTURE
START FEEDLOT CONTROL PROGRAM
BASIC CONTROL TECHNOLOGY AVAILABLE
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WQS FOR PESTICIDES ENFORCEMENT
INITIATE SEDIMENT CONTROL PROGRAM
COMPLETE CONTROL OF PERSISTENT PESTICIDES
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COMBINED SEWER GRANT LEGISLATION
BEGIN CONSTRUCTION
CONSTRUCTION 50% COMPLETE
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TECHNICAL DEMONSTRATION NONSEWERED TECHNOLOGY
NONSEWERED URBAN WASTES 100% CONTROLLED
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PREVENTION PLANS
COMPLIANCE WITH W.Q. STANDARDS
CONTINUING RESTORATION ACTIVITIES
OTHER
VESSEL EFFLUENT STANDARDS
VESSEL CERTIFICATIONS
LEGISLATION ON CONSTRUCTION RUNOFF
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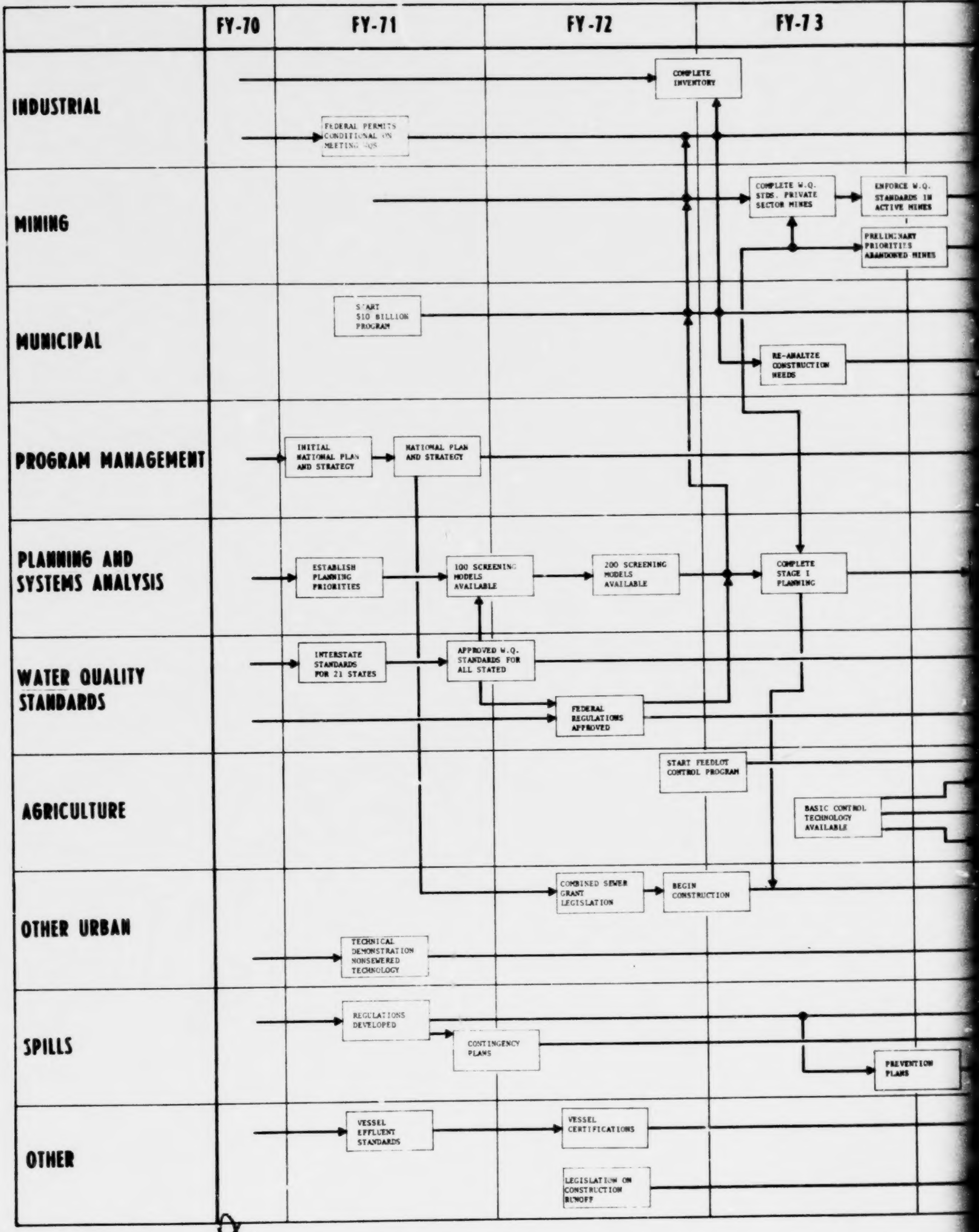
OVERALL MILESTONES PROPOSED PROGRAM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FEDERAL PERMITS CONDITIONAL ON MEETING WQS
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COMPLETE W.Q. STDS. PRIVATE SECTOR MINES
ENFORCE W.Q. STANDARDS IN ACTIVE MINES
PRELIMINARY PRIORITIES ABANDONED MINES
MUNICIPAL
START $10 BILLION PROGRAM
RE-ANALYZE CONSTRUCTION NEEDS
PROGRAM MANAGEMENT
INITIAL NATIONAL PLAN AND STRATEGY
NATIONAL PLAN AND STRATEGY
PLANNING AND SYSTEMS ANALYSIS
ESTABLISH PLANNING PRIORITIES
100 SCREENING MODELS AVAILABLE
200 SCREENING MODELS AVAILABLE
COMPLETE STAGE I PLANNING
WATER QUALITY STANDARDS
INTERSTATE STANDARDS FOR 21 STATES
APPROVED W.Q. STANDARDS FOR ALL STATED
FEDERAL REGULATIONS APPROVED
AGRICULTURE
START FEEDLOT CONTROL PROGRAM
BASIC CONTROL TECHNOLOGY AVAILABLE
OTHER URBAN
COMBINED SEWER GRANT LEGISLATION
BEGIN CONSTRUCTION
TECHNICAL DEMONSTRATION NONSEWERED TECHNOLOGY
SPILLS
REGULATIONS DEVELOPED
CONTINGENCY PLANS
PREVENTION PLANS
OTHER
VESSEL EFFLUENT STANDARDS
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LEGISLATION ON CONSTRUCTION RUNOFF

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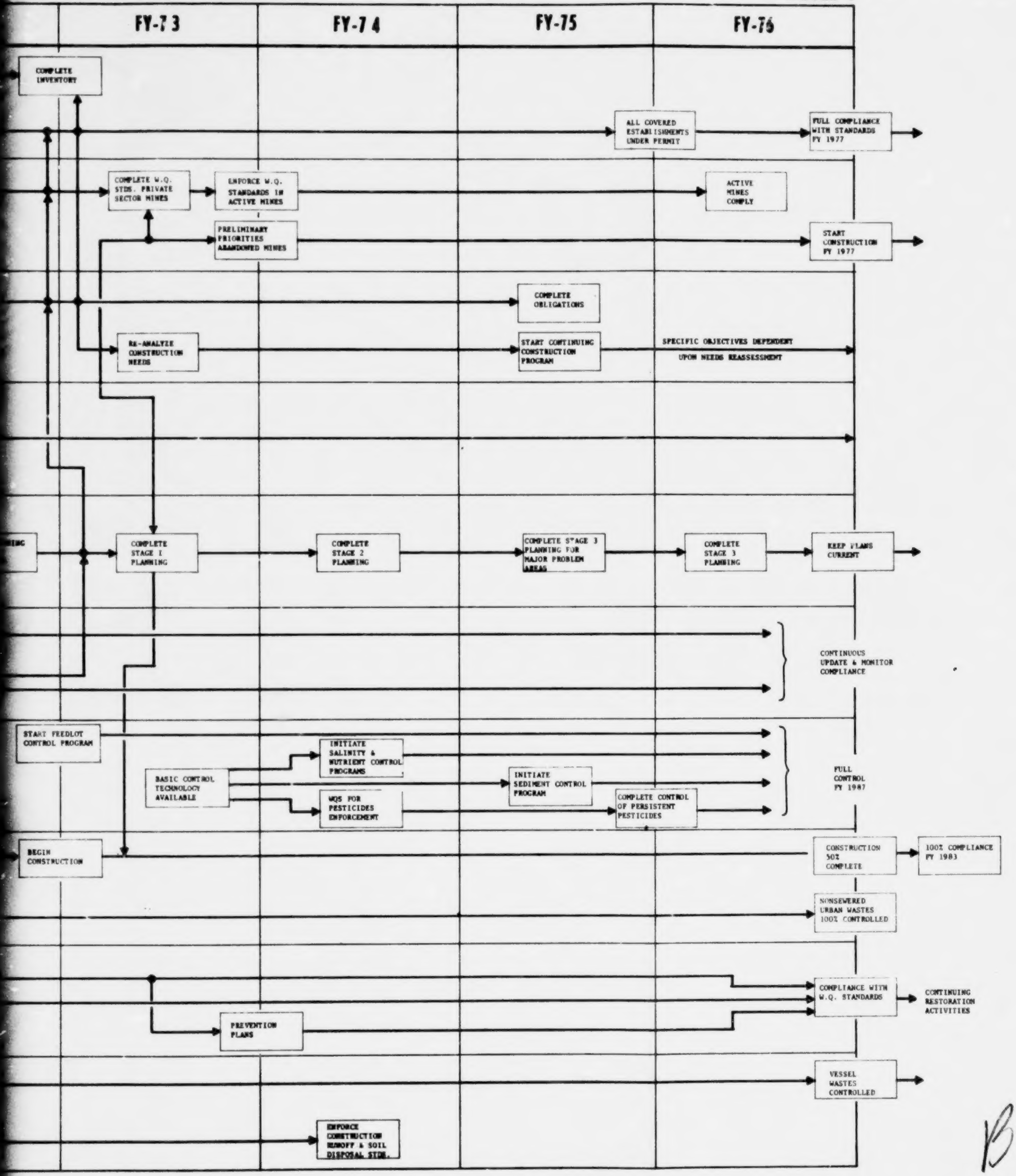
OVERALL MILESTONES
PROPOSED PROGRAM

FIGURE 4



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FULL COMPLIANCE WITH STANDARDS FY 1977
COMPLETE W.Q. STDS. PRIVATE SECTOR MINES
ENFORCE W.Q. STANDARDS IN ACTIVE MINES
ACTIVE MINES COMPLY
PRELIMINARY PRIORITIES ABANDONED MINES
START CONSTRUCTION FY 1977
COMPLETE OBLIGATIONS
RE-ANALYZE CONSTRUCTION NEEDS
START CONTINUING CONSTRUCTION PROGRAM
SPECIFIC OBJECTIVES DEPENDENT UPON NEEDS REASSESSMENT
COMPLETE STAGE I PLANNING
COMPLETE STAGE 2 PLANNING
COMPLETE STAGE 3 PLANNING FOR MAJOR PROBLEM AREAS
COMPLETE STAGE 3 PLANNING
KEEP PLANS CURRENT
CONTINUOUS UPDATE & MONITOR COMPLIANCE
START FEEDLOT CONTROL PROGRAM
INITIATE SALINITY & NUTRIENT CONTROL PROGRAMS
BASIC CONTROL TECHNOLOGY AVAILABLE
INITIATE SEDIMENT CONTROL PROGRAM
WQS FOR PESTICIDES ENFORCEMENT
COMPLETE CONTROL OF PERSISTENT PESTICIDES
FULL CONTROL FY 1987
BEGIN CONSTRUCTION
CONSTRUCTION 50% COMPLETE
100% COMPLIANCE FY 1983
NONSEWERED URBAN WASTES 100% CONTROLLED
COMPLIANCE WITH W.Q. STANDARDS
CONTINUING RESTORATION ACTIVITIES
PREVENTION PLANS
VESSEL WASTES CONTROLLED
ENFORCE CONSTRUCTION RUNOFF & SOIL DISPOSAL STDS.

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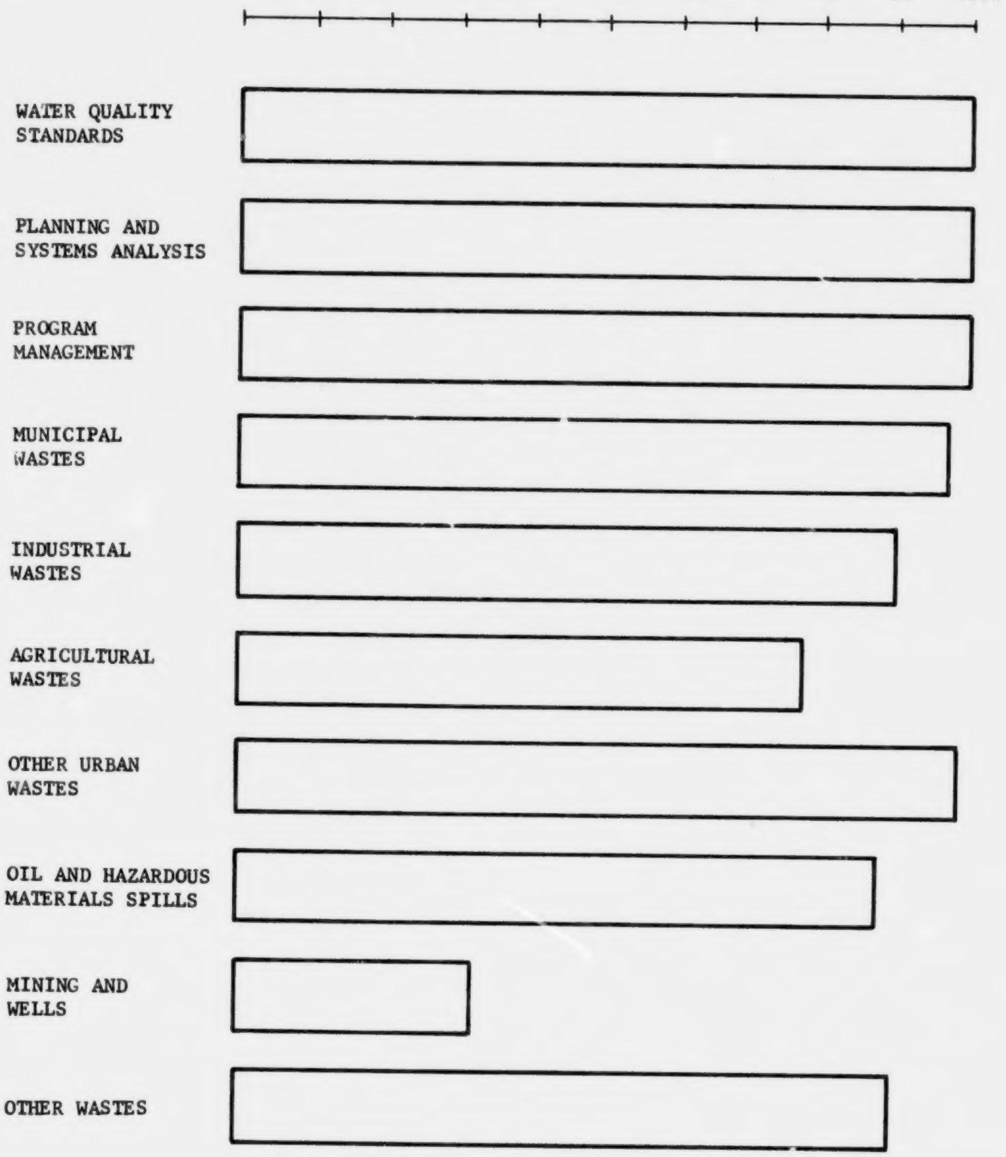


(Based on Financial Summary Data FY 1971 - 1976)

FIGURE 5
PERCENT COMPLETION PROPOSED PROGRAM BY JULY 1976
(OPTIMUM PROGRAM = 100%)

SECTION 2

WATER QUALITY STANDARDS

2.1 THE IMPORTANCE OF STANDARDS

2.2 PROPOSED ACCOMPLISHMENTS

2.3 LEGISLATIVE NEEDS

2.4 DEFINITIONS

2.5 STATUS OF STANDARDS

2.6 INTERRELATIONSHIPS OF CRITERIA, STANDARDS, RELATIONS, AND GOALS

2.7 SUPPORTING EFFORTS

2.8 DESCRIPTION OF THE WATER QUALITY PROGRAM

SECTION 2

WATER QUALITY STANDARDS

2.1 THE IMPORTANCE OF STANDARDS

The refinement and extension of water quality standards constitute the principal and nonsubstitutable element in the strategy for attainment of water quality goals on a national basis. The standards fill a unique role in:

(1) Establishing specific river basin/estuarine area water quality goals through a public review and identification of desired uses and the association of these uses with scientifically established criteria.

(2) Providing a future, publicly-visible timetable for corrective actions for achieving the accepted goals.

(3) Providing mechanisms, however imperfect under existing law, whereby legal and public opinion pressures can be placed upon polluters.

(4) Reassessing the public's desire for quality of water.

(5) Providing a quantitative framework within which to construct detailed technical plans for mid-range and long-term pollution abatement and prevention efforts.

2.2 PROPOSED ACCOMPLISHMENTS

Major milestones included in the proposed program are as follows:

(1)	Full approval of interstate water quality standards.	Jun 1971
(2)	Regulations for establishing effluent standards.	Jan 1972
(3)	Regulations for extending standards and supporting criteria to navigable waters.	Jan 1972

(4)	State adoption of effluent control measures.	Jun	1972
(5)	State adoption of standards for navigable and ground waters.	Dec	1972
(6)	Federal approval of effluent standards.	Jan	1973
(7)	Federal approval of standards for navigable and ground waters.	Jun	1973
(8)	Operational monitoring system for assuring compliance with all water quality standards.	Jan	1976

2.3 LEGISLATIVE NEEDS

Under present Federal law, and under the Administration's legislative proposal, the States have the first opportunity to establish, implement and enforce the water quality standards, including the water quality criteria and the effluent requirements, applicable to their waters. The extent of subsequent Federal involvement and participation is in need of clarification.

The application of water quality requirements without regard to the circumstances of geography necessitates (1) extending the standards authority of the Federal Water Pollution Control Act, as amended, to navigable, ground, and other waters not presently covered, and (2) eliminating the requirement of gubernatorial consent to court action to abate intrastate pollution in violation of State/ Federal standards.

Effective utilization of the water quality standards concept is substantially dependent upon Congressional approval of perfecting amendments, including injunctive powers, as desired in Section 10 of S. 3471.

2.4 DEFINITIONS

Water quality standards consist of the following parts as illustrated in Table 5.

Uses - A delineation of the water uses on a geographic basis for a given water body, coastal area, or stream reach.

THE COMPONENTS OF
WATER QUALITY STANDARDS

USES	CRITERIA	IMPLEMENTATION PLANS
Categories such as:	Measurable water quality requirements such as:	Waste discharge requirements including such items as:
Body-contact recreation. Drinking water supply. Industrial water supply. Trout and other fisheries. Shellfish growing and harvesting. Aesthetics and general recreation.	Concentrations of dissolved oxygen, suspended solids, carbon chloroform extract, mercury, phenol, etc. Numbers of E. Coli, fecal coliforms, viruses, etc., per unit volume of water. Temperature ranges and rates of change. Physical degradation. Toxic components	Type of treatment. Percentage removal. Absolute quantifiable limit of discharge per unit of time.
		Specified time schedule for abatement as follows:
		Submittal of preliminary plans and specifications. Submittal of final plans and specifications. Completion of financing. Award of contract(s). Completion of construction. Commencement of operation. Testing and certification. Continued compliance and periodic testing to assure compliance.

TABLE 5

Criteria - A specification of the physical, chemical, and biological levels that must be achieved to make possible the specified water uses.

Implementation Plan- A schedule for the control of pollution sources to achieve the water quality goals and a statement of the manner in which these goals are to be obtained.

Nondegradation Policy- The Secretary of Interior's nondegradation statement of February 8, 1968, is a major component of the standards and is an important mechanism for accomplishing stated water quality objectives.

2.5 STATUS OF STANDARDS

The present status and efficiency of water quality standards are best judged from two points of view.

First, judgment of the status of standards is based on the assumptions that the currently acceptable water use designations are valid; the criteria are consistent with National Technical Advisory Committee recommendations; and the implementation plans are adequate to meet the Nation's water quality goals.

Of the 54 States and jurisdictions, 23 have been determined to have fully adequate standards and, therefore, have received approval by the Secretary of the Interior. Standards for the remaining 31 States have been partially approved with certain exceptions standing in the way of full approval. Full approval is expected by June 1971.

Most, if not all, approved standards will need to be refined. Revision will be needed from time to time to reflect new knowledge about criteria or changed public desires for water uses and periodic updating of their implementation plans.

Second, there are several basic deficiencies in the currently accepted "ground rules" for water quality standards.

(1) Current scientific knowledge about the effects of water quality on water uses is not sufficient to establish legally tight and readily enforceable criteria. Enforcement against violations of criteria can be severely hampered by the necessity for judicial review of the criteria themselves. The solution is better information on the pollutant-use relationship.

(2) The implementation plans of the standards are administratively and legally weak from the following standpoints: their treatment requirements are not based on a precise determination of effluent quality needed to comply with the criteria; their abatement schedules fail to consider fully the priority of abatement action as determined by the relative pollutional impacts of waste sources or the financial aspects of abatement; they generally fail to provide abatement requirements for waste waters from other than municipal or industrial point sources. These deficiencies derive basically from the lack of comprehensive, detailed basin and area plans, and will require the development of such plans for correction.

(3) Generally, the capability to enforce readily the standards is encumbered by time-consuming and limiting legal requirements. Also, present standards enable taking abatement action only after the fact.

(4) In many of the standards, the designation of the uses to be protected lack desired specificity which can, if brought to issue, complicate the enforcement of the standards. This deficiency derives principally from the lack of information which forms the basis for public determination of the uses. This deficiency could be corrected by adequate basin and area plans, which would provide such input.

2.6 INTERRELATIONSHIPS OF CRITERIA, STANDARDS, REGULATIONS, AND GOALS

2.6.1 Present and Future Water Quality Standards

Water quality standards serve two purposes: to protect existing high quality waters; and to provide for the restoration of degraded waters. Standards must be continually upgraded to fulfill ever-changing needs of our society. A hierarchy of levels for present and future water quality standards is presented in Table 6.

Present water quality standards are in some cases sufficient to guarantee acceptable quality. In general, however, present standards are not of the acceptable level since nonpoint sources are not included in implementation plans, nor do they account for potential future needs. In some cases criteria rest upon questionable scientific foundations.

TABLE 6
PRESENT AND FUTURE LEVELS OF WATERS QUALITY STANDARDS

Level		Present	Future
Ultimate	Goal	Man and nature in complete harmony	Expanding population of man and nature in complete harmony
	Water uses	All known uses	All known and foreseeable uses
	Quality criteria	Complete scientific and technical knowledge to accomplish above uses	Complete scientific and technical knowledge to accomplish above uses
	Implementation Plan	Control of all manmade effects on the water environment	Control of all manmade and deleterious natural effects on the water environment
Optimum	Goal	Attainment of uses which allow man and nature to live in mutual co-existence	Attainment of uses which allow man with an expanding population and nature to live in mutual co-existence
	Uses	Present and major potential water uses	All potential uses
	Criteria	Knowledge of pollution-use relationship to accomplish enhancement for stated uses and sources	Knowledge of pollution-use relationship to accomplish enhancement for stated uses and sources
	Implementation Plan	Control of all point and nonpoint existing sources	Control of all point and nonpoint existing and potential sources
Acceptable	Goal	Minimize man's deleterious effects on nature within present economic constraints	Minimize man's deleterious effects on nature
	Uses	Present and some potential beneficial uses	Use to meet all future demands
	Criteria	Knowledge of pollution-use relationship to accomplish enforcement for stated uses and sources	Knowledge of pollution-use relationship to accomplish enforcement for stated uses and sources
	Implementation Plan	Control of all existing point sources	Control of all existing point and nonpoint sources
Current	Goal	Minimize man's deleterious effects on nature within resources available	Not compatible with national goals.
	Uses	Some or all present uses	
	Criteria	Knowledge of pollution-use relationship to accomplish maintenance for uses and sources.	
	Implementation Plan	Control of major point sources	

The acceptable program to achieve compliance with standards can be accomplished with existing and potential resources. The program is based on compromise and choice. A decision must be made concerning what wastes will be controlled. A factor in this choice will be whether or not gains in water quality justify the costs. To carry out this program, technical knowledge for upgrading criteria must be increased to effect control of all existing point sources.

2.6.2 Probability of Accomplishment

In most cases the present standards are at, or very close to, the acceptable in terms of uses and criteria. Thus, the acceptable level as defined in this chart has a high probability of accomplishment under the proposed program, since quality criteria have been recommended and adopted by most States to control sources of pollution.

Implementation plans in current standards neither guarantee the achievement of water quality when completed nor assure cost-effective abatement of pollution. In many cases, this is due to lack of planning to account for nonpoint sources as well as reluctance of communities to take advantage of economies of scale through effective regionalization.

The basin planning program provides the means for bringing current implementation plans to acceptable levels. The resulting plans, based upon adequate technical and economic information and involving the total participation of the jurisdictions involved, will not only assure the achievement of water quality, but will also assure that it is achieved in a cost-effective manner.

2.6.3 Legislative Program Regulatory Requirements

In order to apply water quality requirements equitably and effectively without regard to the circumstances of geography, the standards authority should be applied not only to interstate waters, but also to intrastate, navigable, and ground waters not presently covered. Gubernatorial consent to court action to abate intrastate pollution in violation of State/Federal standards should be removed as a prerequisite to Federal actions.

An important statutory need is the authority for FWQA to provide leadership to establish uniform national effluent standards as a component of water quality standards. Uniform effluent standards would permit the specification of the permissible discharges for each municipal and industrial waste source and would clearly indicate to each waste discharger pretreatment requirements he must meet.

Federal legislation has been proposed to authorize the establishment of effluent standards. Adoption of this legislation would be a major step forward in increasing the effectiveness of local water pollution control programs.

In addition, authority to institute prompt enforcement measures including injunctive action to prevent violations of water quality standards is needed.

2.7 SUPPORTING EFFORTS

2.7.1 Adequate Monitoring of Water Quality

Legal substantiation of violations and the feasibility and reasonableness of subsequent abatement actions depend on good information. An issue is the degree of certainty of information required to assure compliance versus the cost of obtaining the information in a timely manner.

There are approximately 2 million miles of navigable and interstate streams, 12 thousand miles of coastline, 61 thousand square miles of Great Lakes, 65 thousand square miles of other inland open waters, and 1.5 million square miles of ground water aquifers in the United States. These waters, if covered by water quality standards, must be monitored in a manner sufficient to identify noncompliance with standards and the causes of noncompliance.

These conditions point to the need for development of systems, probably involving a high degree of automation, to provide data in support of enforcing standards, irrespective of whether the standards are based on receiving water characteristics or effluent characteristics. As a part of the standards and planning programs, needs will be determined and appropriate Federal, State and local responsibilities established so that appropriate action can be implemented.

2.8 DESCRIPTION OF THE WATER QUALITY PROGRAM

2.8.1 Establish Strategy

There are two paths along which Federal action can proceed: Federal assistance and Federal enforcement. See Figure 6.

These mechanisms are mutually supportive in the achievement of water quality goals. Under both paths the State retains an important role. The State should act promptly and vigorously to secure

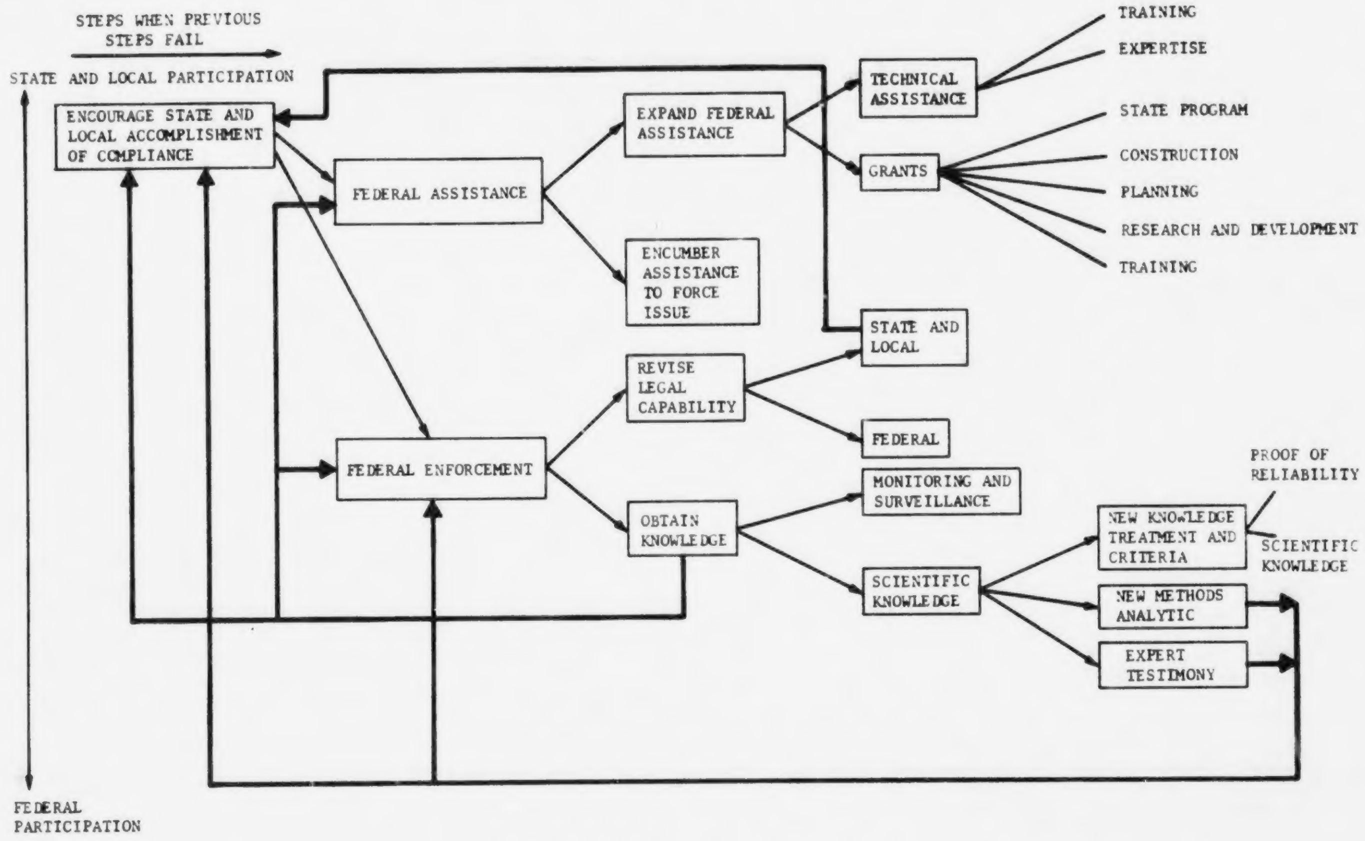

STEPS WHEN PREVIOUS STEPS FAIL
STATE AND LOCAL PARTICIPATION
FEDERAL PARTICIPATION
ENCOURAGE STATE AND LOCAL ACCOMPLISHMENT OF COMPLIANCE
FEDERAL ASSISTANCE
FEDERAL ENFORCEMENT
EXPAND FEDERAL ASSISTANCE
ENCUMBER ASSISTANCE TO FORCE ISSUE
REVISE LEGAL CAPABILITY
OBTAIN KNOWLEDGE
TECHNICAL ASSISTANCE
GRANTS
STATE AND LOCAL
FEDERAL
MONITORING AND SURVEILLANCE
SCIENTIFIC KNOWLEDGE
TRAINING
EXPERTISE
STATE PROGRAM
CONSTRUCTION
PLANNING
RESEARCH AND DEVELOPMENT
TRAINING
NEW KNOWLEDGE TREATMENT AND CRITERIA
NEW METHODS ANALYTIC
EXPERT TESTIMONY
PROOF OF RELIABILITY
SCIENTIFIC KNOWLEDGE

FIGURE 6
FLOW DIAGRAM OF STRATEGY TO ACHIEVE COMPLIANCE WITH STANDARDS

voluntary compliance with standards. In cases where 180-day notices of violations of standards have been issued every effort must be made to secure voluntary compliance prior to court action.

Each of the paths in the flow diagram of strategy (Figure 6) indicates decisions that must be made for specific cases as they arise for any given situation. Particular paths or mixtures of paths will be most cost-effective.

2.8.2 Priorities for Acquiring Information to Upgrade Criteria

Upgrading of water quality criteria is based upon obtaining essential information on the pollution-use relationship. In Table 7 priorities have been established for each of eight classes of pollutants for obtaining short-term information needed to achieve acceptable levels of criteria and longer-term information needed to achieve optimum levels of criteria.

Attention must be focused on areas where knowledge is most deficient. A research program has been developed for providing analytical information for upgrading criteria. Timing is very important since some areas of research cover long-term intervals. Short- or long-term research programs for criteria must thus be matched against the state of technology of measurement and technology of control.

2.8.3 Program Milestones

Achieving the national water quality objectives by 1976 will require the successful and timely accomplishment of tasks shown on Figure 7. The key element is to promulgate by January 1972 Federal regulations for water quality standards and effluent control as they pertain to all interstate, intrastate, navigable, and ground waters.

To accomplish the overall objectives, eight supporting program activities will require accelerated emphasis and resources:

(1) State water quality standards for all interstate streams must be completed and approved.

(2) Water quality research must determine and develop information to support and substantiate improved criteria and effluent controls.

(3) Economic and practicable treatment techniques must exist for each significant industrial waste.

PRIORITIES OF OBTAINING INFORMATION TO UPGRADE WATER QUALITY CRITERIA

Criteria Categories	SHORT TERM Information Needs		LONG TERM Information Needs	
	Priority by Level (1)	Priority by Rank (2)	Priority by Level (1)	Priority by Rank (2)
Oxygen Demanding Wastes	L	8	L	8
Infectious Agents	H	2	M	6
Plant Nutrients	M	5	H	1
Synthetic Organic Chemical Exotics and Pesticides	H	1	H	2
Inorganic and Mineral Substances	L	7	L	7
Sediments	M	6	H	3
Radioactive Materials	M	4	M	4
Heat	H	3	M	5

1) H = High
M = Medium
L = Low

2) 1 is highest priority
8 is lowest priority

TABLE 7

(4) A program for continual updating of information on water quality criteria must be operated on a current basis.

(5) A program to revise water quality standards based upon basin planning studies and water quality criteria research and development must be initiated.

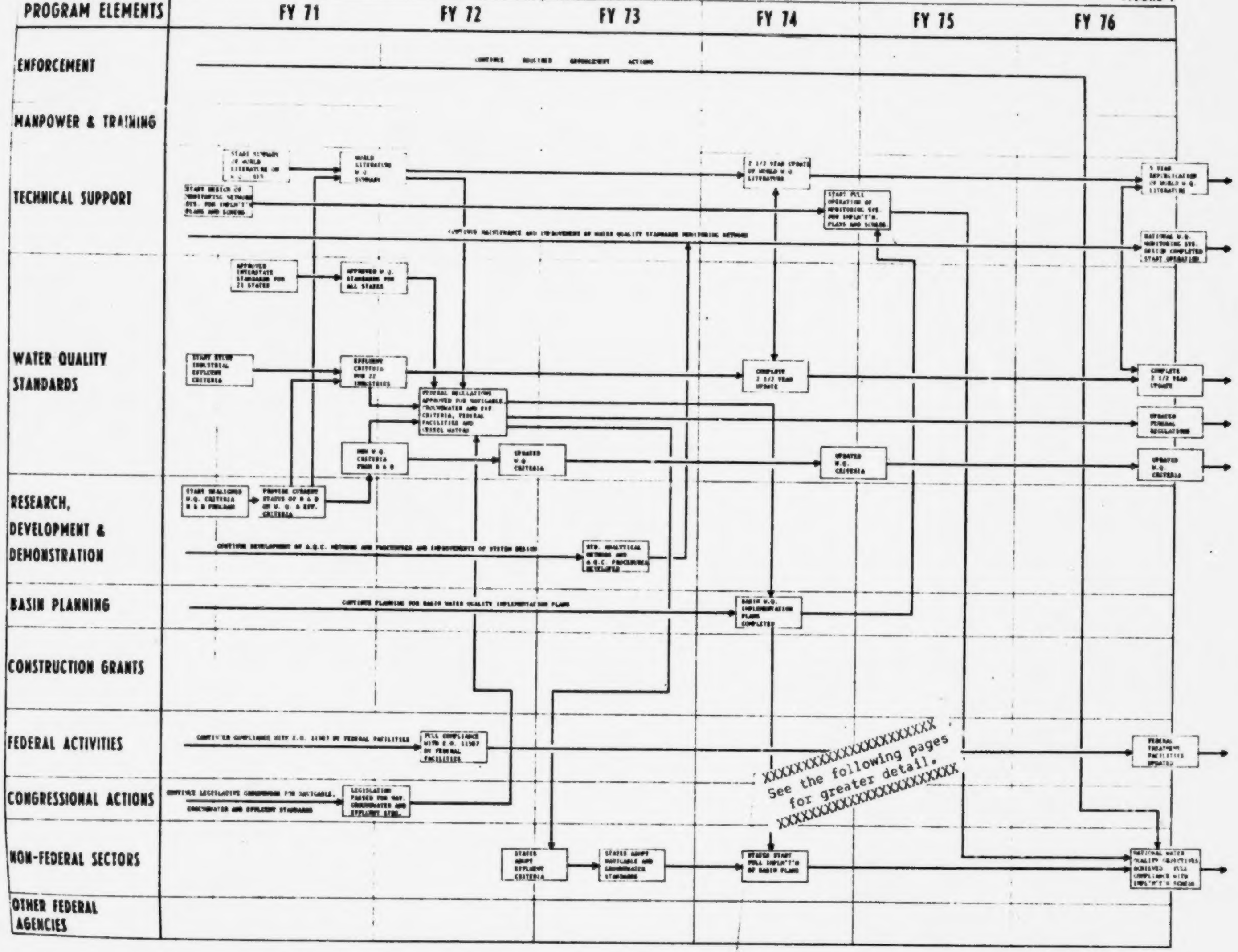
(6) An expanded national water quality monitoring network must assure compliance with standards and effluent controls.

(7) Standards and procedures for effective and analytical quality control must be developed. This is essential to support key legal actions in enforcement cases.

(8) A cooperative but aggressive enforcement program must be implemented to guarantee high water quality.

WATER QUALITY STANDARDS

FIGURE 7


PROGRAM ELEMENTS
FY 71
FY 72
FY 73
FY 74
FY 75
FY 76
ENFORCEMENT
MANPOWER & TRAINING
TECHNICAL SUPPORT
WATER QUALITY STANDARDS
RESEARCH, DEVELOPMENT & DEMONSTRATION
BASIN PLANNING
CONSTRUCTION GRANTS
FEDERAL ACTIVITIES
CONGRESSIONAL ACTIONS
NON-FEDERAL SECTORS
OTHER FEDERAL AGENCIES
CONTINUE REQUIRED ENFORCEMENT ACTIONS
START SUMMARY OF WORLD LITERATURE ON W.Q. SES
WORLD LITERATURE W.Q. SUMMARY
START DESIGN OF MONITORING NETWORK SYS. FOR IMPLM'T'G PLANS AND SCHEDS
CONTINUE MAINTENANCE AND IMPROVEMENT OF WATER QUALITY STANDARDS MONITORING NETWORK
2 1/2 YEAR UPDATE OF WORLD W.Q. LITERATURE
START FULL OPERATION OF MONITORING SYS. FOR IMPLM'T'G PLANS AND SCHEDS
5 YEAR REPUBLICATION OF WORLD W.Q. LITERATURE
NATIONAL W.Q. MONITORING SYS. DESIGN COMPLETED START OPERATION
APPROVED INTERSTATE STANDARDS FOR 21 STATES
APPROVED W.Q. STANDARDS FOR ALL STATES
START STUDY INDUSTRIAL EFFLUENT CRITERIA
EFFLUENT CRITERIA FOR 22 INDUSTRIES
FEDERAL REGULATIONS APPROVED FOR NAVIGABLE, GROUNDWATER AND EFF CRITERIA, FEDERAL FACILITIES AND VESSEL WASTES
NEW W.Q. CRITERIA FROM R & D
UPDATED W.Q. CRITERIA
COMPLETE 2 1/2 YEAR UPDATE
UPDATED W.Q. CRITERIA
COMPLETE 2 1/2 YEAR UPDATE
UPDATED FEDERAL REGULATIONS
UPDATED W.Q. CRITERIA
START REALIGNED W.Q. CRITERIA R & D PROGRAM
PROVIDE CURRENT STATUS OF R & D ON W.Q. & EFF. CRITERIA
CONTINUE DEVELOPMENT OF A.Q.C. METHODS AND PROCEDURES AND IMPROVEMENTS OF SYSTEM DESIGN
STD. ANALYTICAL METHODS AND A.Q.C. PROCEDURES DEVELOPED
CONTINUE PLANNING FOR BASIN WATER QUALITY IMPLEMENTATION PLANS
BASIN W.Q. IMPLEMENTATION PLANS COMPLETED
CONTINUED COMPLIANCE WITH E.O. 11507 BY FEDERAL FACILITIES
FULL COMPLIANCE WITH E.O. 11507 BY FEDERAL FACILITIES
FEDERAL TREATMENT FACILITIES UPDATED
CONTINUE LEGISLATIVE CONSIDERATION FOR NAVIGABLE, GROUNDWATER AND EFFLUENT STANDARDS
LEGISLATION PASSED FOR NAV. GROUNDWATER AND EFFLUENT STDS.
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STATES ADOPT NAVIGABLE AND GROUNDWATER STANDARDS
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for greater detail.
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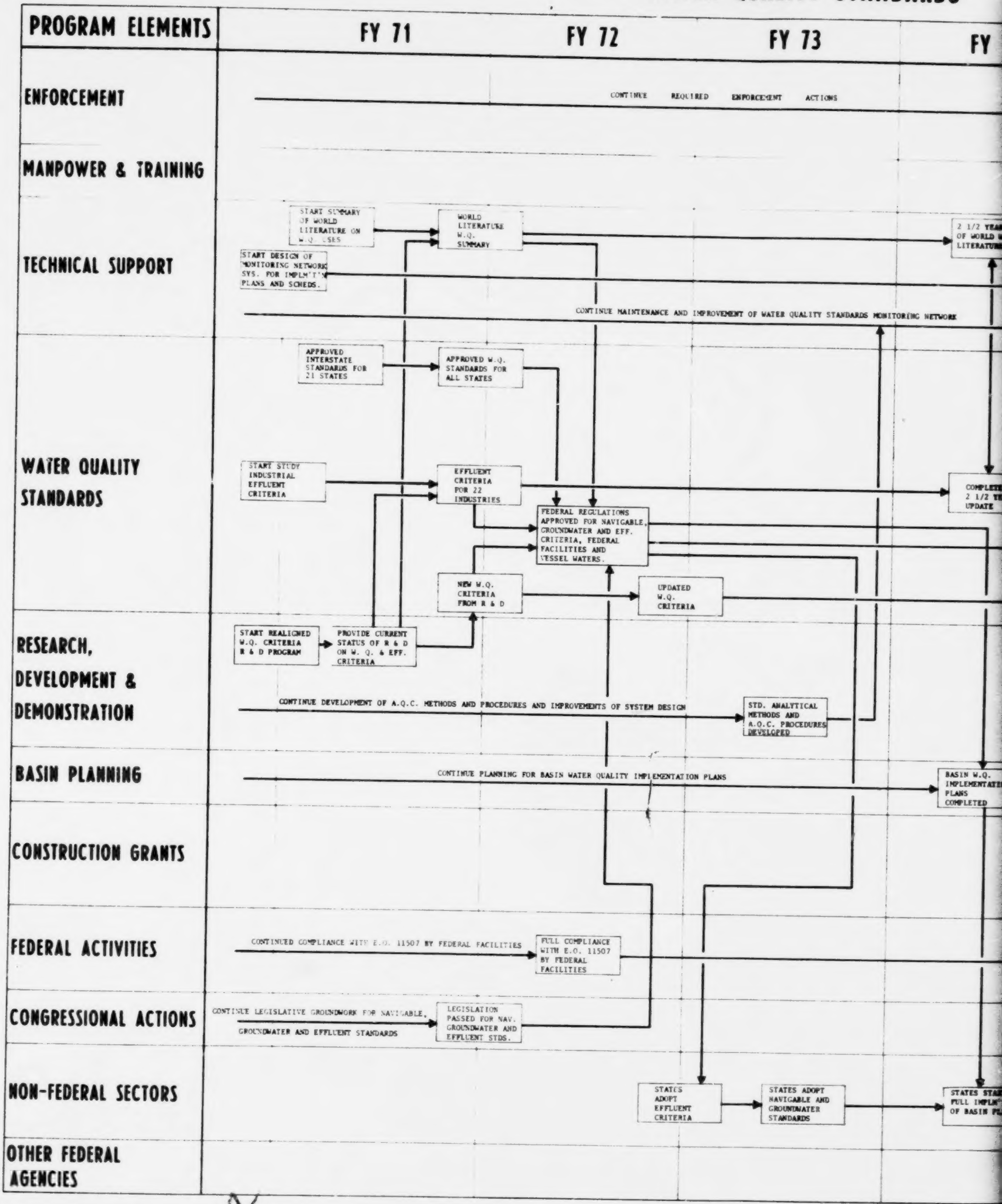
WATER QUALITY STANDARDS


PROGRAM ELEMENTS
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FULL COMPLIANCE WITH E.O. 11507 BY FEDERAL FACILITIES
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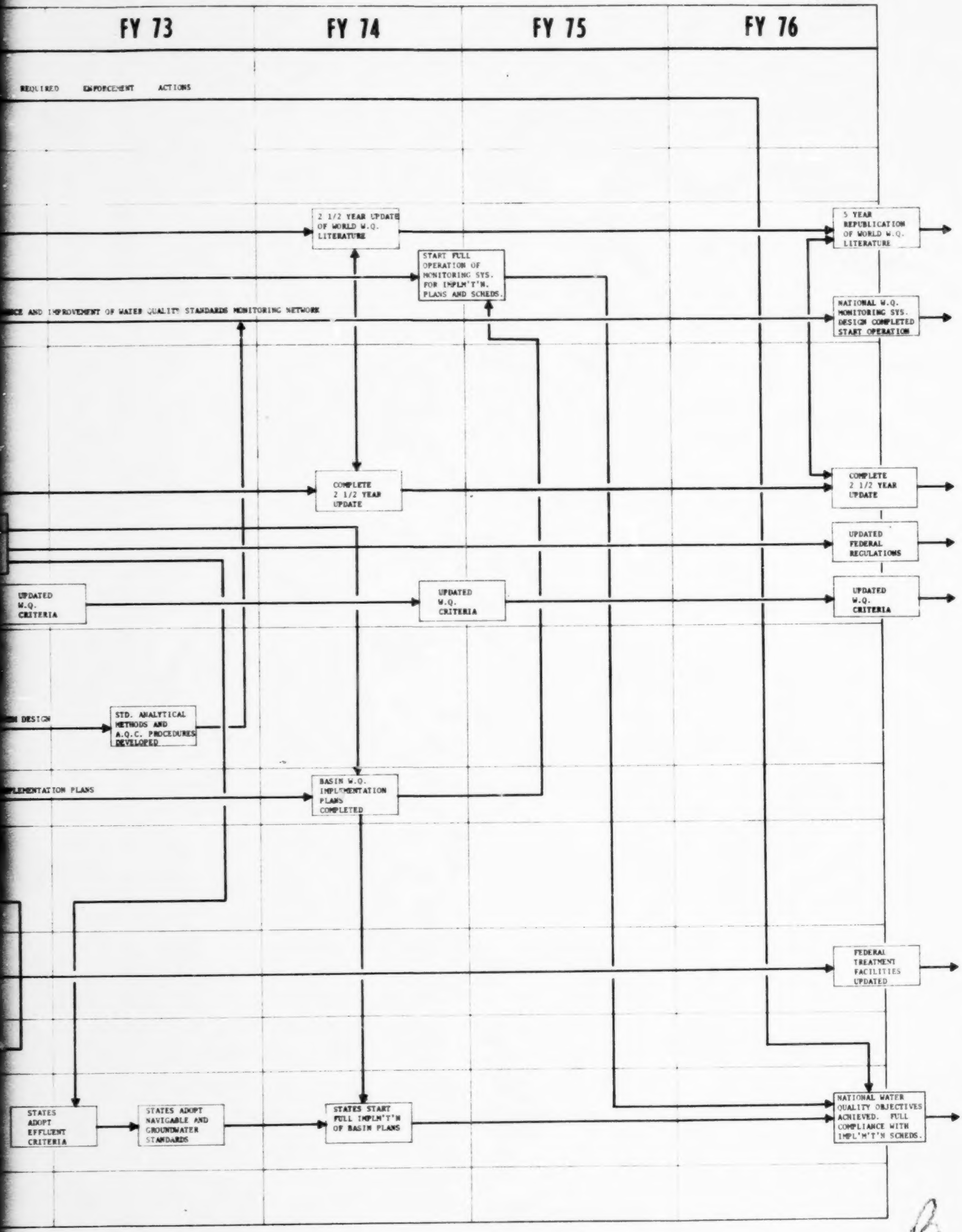
FIGURE 7


FY 73
FY 74
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FY 76
REQUIRED ENFORCEMENT ACTIONS
2 1/2 YEAR UPDATE OF WORLD W.Q. LITERATURE
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UPDATED W.Q. CRITERIA
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NATIONAL WATER QUALITY OBJECTIVES ACHIEVED. FULL COMPLIANCE WITH IMPL'M'T'N SCHEDS.

B

SECTION 3

BASIN PLANNING AND SYSTEMS ANALYSIS

3.1 RELATIONSHIP OF PLANNING TO ACHIEVEMENT OF WATER QUALITY STANDARDS

3.2 SPECIFIC OBJECTIVES

3.3 IMPORTANCE OF BASIN PLANNING

3.4 FEDERAL/STATE RELATIONSHIP IN PLANNING AND COST-SHARING

3.5 PROGRAM OUTLINE

3.6 PROGRAM MILESTONES

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SECTION 3

BASIN PLANNING AND SYSTEMS ANALYSIS

3.1 RELATIONSHIP OF PLANNING TO ACHIEVEMENT OF WATER QUALITY STANDARDS

An effective plan is the second basic element in the national water quality strategy. The major increases in funds for assistance to communities for construction of waste treatment plants ($214 million to $1,000 million) in a one-year period creates a crisis need for immediate plans for critical basin and metropolitan areas. In response to the situation FWQA has conducted a detailed review of needs (August 1970) and has developed planning priority schedules for each of the Nation's river basins. The following program proposals are based upon the in-depth analysis.

For the FY 1971-1976 period, the primary objectives of the planning program are:

(1) To assure a high level of certainty that water quality standards implementation plans will achieve in-stream goals.

(2) To maximize the cost-effectiveness of the massive investment in pollution abatement actions required to achieve national water quality objectives.

For the longer range, the objective is to improve and assure maintenance of established water quality standards.

3.2 SPECIFIC OBJECTIVES (keyed to Figure 9)

The following basic program objectives have been established:

(1) Target Date - January 1971

- Develop and issue "Planning Guidelines" for general improvement of ongoing planning.
- Establish needed planning data system.

- Initiate required Stage One planning.
- Develop simple mathematical basin models to screen proposed construction in conjunction with available plans for 200 highest priority basins; initiate requests for contract proposals (RFP's) for more fully developed models in the first 100 basins.
- Initiate development of lake and coastal models.

(2) Target Date - June 1971

- Complete development of models for 100 basins.
- Continue Stage One plan development.

(3) Target Date - January 1972

- Complete all data collection required for Stage One planning and furnish to Water Quality Standards Program.
- Begin development of additional lake and coastal models.

(4) Target Date - June 1972

- Have available screening models for 200 basins for application.
- Complete first coastal model.

(5) Target Date - January 1973

- Complete Stage One planning.
- Complete development of all lake models.
- Begin required Stage Two planning.
- Begin required Stage Three planning.

(6) Target Date - June 1973

- Complete required coastal models.

(7) Target Date - January 1974

- Complete Stage Two planning incorporating revised water quality standards.

(8) Target Date - January 1975

- Complete Stage Three planning for all major problem areas.

(9) Target Date - January 1976

- Complete Stage Three planning in all areas where required to assure completion of required implementation schedules and adoption by June 1976.

3.3 IMPORTANCE OF BASIN PLANNING

Previous efforts to create useful basin, regional and metropolitan plans were deficient in that they did not contain implementation as a "leading edge."

A properly prepared plan:

(1) Provides the implementable and enforceable vehicle for achieving water quality standards.

(2) Identifies specific water quality management goals for public and/or private action.

(3) Identifies water quality management problems, needs and priorities.

(4) States policies for the use of resources in meeting water quality goals.

(5) Determines impact of effluents and other pollutant loads on receiving water quality.

(6) Determines treatment needs or other remedial actions on difference between existing (or projected) water quality and quality prescribed by standards.

(7) Programs capital improvements and other expenditures for managing water quality on the basis of relative urgency and cost-effectiveness, together with

definitive arrangements for financing these expeditures (at least in the earlier years of the program).

(8) Identifies how related plans and activities will be coordinated with water quality management.

(9) Proposes necessary supporting regulatory and administrative measures.

(10) Identifies who is responsible for actions to carry out the plan.

(11) Provides a mechanism for plan updating.

3.4 FEDERAL/STATE RELATIONSHIP IN PLANNING AND COST-SHARING

A 1970 survey conducted by FWQA disclosed that only 35 of 760 areas (metro, regional or basin) have plans of even limited utility in terms of providing the needed planning products.* The planning status nationwide has been evaluated and the areas have been ranked, considering population, planning cost, investment, and other factors. Thus, the magnitude of the remaining planning job is great and the time is short in view of projected national investment. Figure 8 indicates the effect of establishing a national priority for the planning effort. With priorities established to undertake planning in the heavily populated metropolitan areas and associated river basins first, and a lower order of priority for less populated and less complex problems, it can be seen that a large investment in planning in early part of the FY 1971-1976 program period will impact a majority of the population and much of the proposed investment in municipal treatment facilities. The use of a national priority to guide the plan development would assure a considerable cost-effective impact on construction of waste treatment facilities. However, all planning areas would require some level of planning to assure meeting the water quality objective.

The magnitude of the planning need is determined by the number of metropolitan or regional planning areas which require improvement

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*The 760 areas may be broken down into subareas on a geographic basis, resulting in a total of 1300 areas and subareas as well as approximately 700 estuaries.

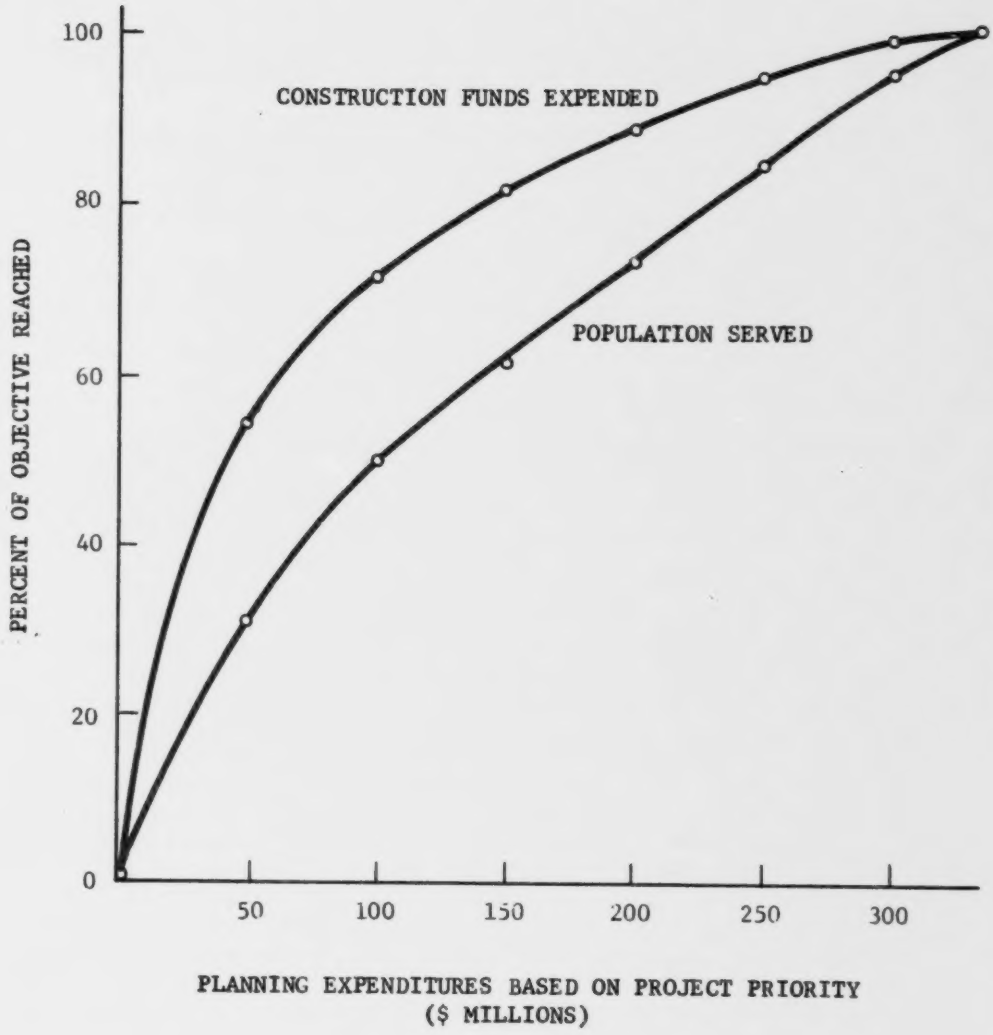


FIGURE 8
IMPACT OF PLANNING ON
CONSTRUCTION INVESTMENT AND POPULATION

or the development of plans, and by the degree of utility of presently available plans. In terms of planning areas, the general utility of planning presently available is:

Plan Adequacy for Water Quality Management	Number of Areas
No Utility	591
Little Utility	134
Limited Utility	35
Full Utility	0
Total Need	760

The above evaluations of plan utility assume three levels of planning defined solely in terms of their utility in the decisionmaking processes for achieving water quality standards. The classifications are full utility, limited utility, and little utility as follows:

Name	Definition
Full Utility	Meets planning required for construction grants regulations (18 CFR 601). Provides information on both significant point and nonpoint sources. Utilizes systems approach integrating facility construction, management, financial, and legislative components. Valid predictive models are available where required.
Limited Utility	Meets planning required for construction grant regulations (18 CFR 601). Inconclusive information on nonpoint source pollution. Limited systems approach utilized insofar as data permits. Predictive model not fully operational but useful. However, the plan may be used for regionalization considerations, short-term investment and for partial analysis of the adequacy of existing water quality standards.
Little Utility	Does not meet planning required for construction grants regulations (18 CFR 601). Major factors ignored or insufficient detail available. Single-purpose action not related to other actions.

Strong reasons exist for an appropriate combination of Federal, State and local planning effort. Broad Federal guidance and support could assure the proper perspective and priority considerations. State establishment or designation of responsible planning agencies coupled with State participation and coordination with these agencies would assure stronger State water quality programs and consistent plans for adoption as part of the water quality standards. Development of plans by local governments as the responsible planning agencies would provide the grass roots involvement essential to plan implementation.

Thus the combination of Federal stimulation, guidance and support of State and local coordinated planning would get the needed plans developed and implemented in a priority order and timely fashion to assure meeting national water quality objectives.

The program recognizes the urgency of need as viewed against the massive construction grants program and the general lack of immediate financial resources at the State and local levels. It is proposed that this problem be offset by including a planning grant financial assistance program to cover up to 75 percent of the costs of plan development. The remaining 25 percent would be required from State and local sources. The rationale for this approach rests upon three major considerations.

(1) Under the regulations published July 2, 1970, 18 CFR 601.32-33, the States and local agencies are required to have basin and metropolitan or regional water quality management plans as a condition to receiving Federal construction grants for waste treatment facilities. These commit the local planning agencies together with the States to undertake a level of planning--with or without Federal assistance--necessary to achieve water quality standards and to relate to proposed facility construction.

(2) Based on past experience, it is unrealistic to expect the local agencies and the States to undertake this level of planning if the level of Federal support would be less than the usual half of the costs of a needed public program. Already hard-pressed for resources to meet their many obligations and commitments, the local communities lack the resources adequate to accomplish the task. The question of fund availability becomes even more pressing in the face of the urgency to develop required cost-effective plans ahead of the needed facility construction.

(3) Effective pollution control requires development of intergovernmental agreement on an areawide basis both in metropolitan/regional and basin areas. Additionally, pollution control is a regulatory function. These two aspects suggest that the share of Federal support of planning required to achieve water quality objectives should be greater than half. Other Federal grant programs have required up to a 90 percent Federal share to assure effective program implementation.

3.5 PROGRAM OUTLINE

The overall goal of the program of water quality planning is to promote, guide and support the establishment of effective plans, acceptable at the Federal, State and local levels. The proposed program provides for staged development by the States and the local planning agencies of needed plans in sufficient detail to maximize the return from the $10 billion investment in municipal treatment facilities to which the Administration is committed. At the same time, the staged development will lead to full utility plans necessary to achieve FWQA water quality objectives by the end of FY 1976 and will include adoption of such plans by the States as Water Quality Standards Implementation Plans.

The proposed program provides for continued participation by FWQA in Federal interagency water resources planning and activities.

The Planning program would be accomplished in three stages:

Stage One is directed toward maximizing the cost-effectiveness of planning on the construction grants program. As an aggregate, plans developed in this stage would be defined as "limited utility." However, individual plans will vary widely in scope and level of detail--the most detail in plans dealing with the more complex situations.

Stage Two will complete the planning required to obtain optimum cost-effectiveness in the construction grants program. In addition to providing a greater level of detail and broader scope, where necessary, all plans completed through the end of this stage will incorporate the requirements of the new water quality standards regulations.

Stage Three planning will be of greater scope and detail and will provide implementation schedules for the new water quality standards. Solutions and schedules for abatement of pollution caused by nonpoint sources will be included.

3.6 PROGRAM MILESTONES

The planning program, implemented under 18 CFR 601 et seq., includes limited assistance through the funds available under the planning grant program authorized by Section 3(c) of the Federal Water Pollution Control Act, as amended. Securing additional funds up to the full amount required before April 1971 will allow timely development of the planning program. This will, however, slightly lessen the impact on construction plans than had the funds been available in the first quarter of FY 1971.

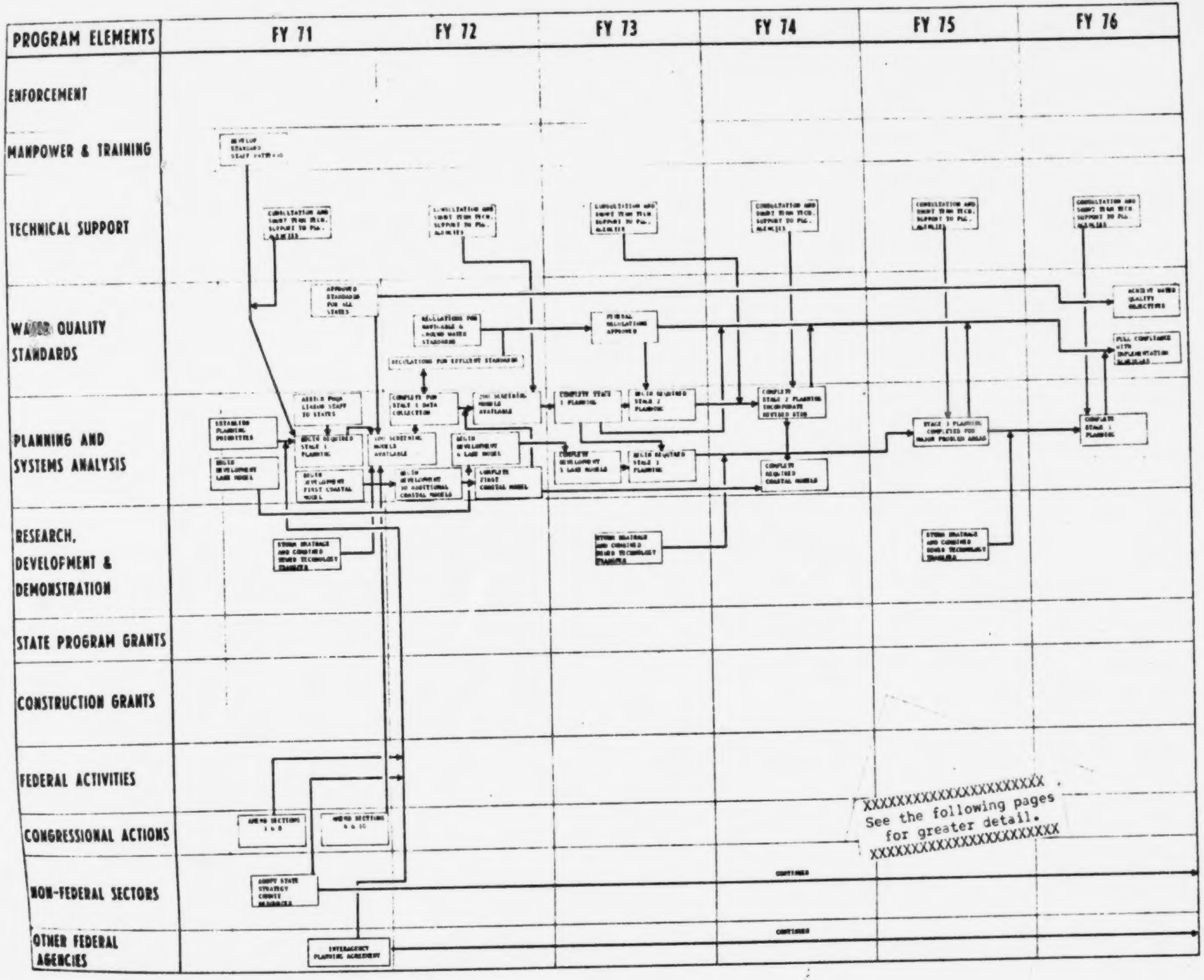
Several actions are currently underway without a large Federal Assistance Program that will permit earliest possible implementation of the proposed planning program. Preliminary guidelines for implementing 18 CFR 601 have been issued and discussion meetings with all States are in process. Prior to January 1971, final planning area boundaries will be determined; planning agencies for each area will be identified; preliminary guidelines will be revised; and planning schedules will be developed in line with the national planning priority index.

When the proposed program is approved, current activities will be accelerated, beginning with a series of meetings with State and local officials to apprise them of the expanded Federal assistance to become available and of the program requirements. Applications will then be developed for future funding on a priority basis such that when funds become available, delay in committing the funds will be minimized.

Milestones have been established as shown in Figure 9 which are consistent with and predicated upon launching the fully funded planning during the last half of FY 1971.

PLANNING AND SYSTEMS ANALYSIS

FIGURE 9


PROGRAM ELEMENTS
FY 71
FY 72
FY 73
FY 74
FY 75
FY 76
ENFORCEMENT
MANPOWER & TRAINING
TECHNICAL SUPPORT
WATER QUALITY STANDARDS
PLANNING AND SYSTEMS ANALYSIS
RESEARCH, DEVELOPMENT & DEMONSTRATION
STATE PROGRAM GRANTS
CONSTRUCTION GRANTS
FEDERAL ACTIVITIES
CONGRESSIONAL ACTIONS
NON-FEDERAL SECTORS
OTHER FEDERAL AGENCIES
DEVELOP STANDARD STAFF PATTERN
CONSULTATION AND SHORT TERM TECH. SUPPORT TO PLG. AGENCIES
APPROVED STANDARDS FOR ALL STATES
REGULATIONS FOR NAVIGABLE & GROUND WATER STANDARDS
REGULATIONS FOR EFFLUENT STANDARDS
FEDERAL REGULATIONS APPROVED
ACHIEVE WATER QUALITY OBJECTIVES
FULL COMPLIANCE WITH IMPLEMENTATION SCHEDULES
ESTABLISH PLANNING PRIORITIES
BEGIN DEVELOPMENT LAKE MODEL
ASSIGN FWQA LIAISON STAFF TO STATES
BEGIN REQUIRED STAGE 1 PLANNING
BEGIN DEVELOPMENT FIRST COASTAL MODEL
COMPLETE FOR STAGE 1 DATA COLLECTION
100 SCREENING MODELS AVAILABLE
BEGIN DEVELOPMENT 10 ADDITIONAL COASTAL MODELS
200 SCREENING MODELS AVAILABLE
BEGIN DEVELOPMENT 4 LAKE MODEL
COMPLETE FIRST COASTAL MODEL
COMPLETE STAGE 1 PLANNING
BEGIN REQUIRED STAGE 2 PLANNING
COMPLETE DEVELOPMENT 5 LAKE MODELS
BEGIN REQUIRED STAGE 3 PLANNING
COMPLETE STAGE 2 PLANNING INCORPORATE REVISED STDS
COMPLETE REQUIRED COASTAL MODELS
STAGE 3 PLANNING COMPLETED FOR MAJOR PROBLEM AREAS
COMPLETE STAGE 3 PLANNING
STORM DRAINAGE AND COMBINED SEWER TECHNOLOGY TRANSFER
AMEND SECTIONS 3 & 8
AMEND SECTIONS 4 & 10
ADOPT STATE STRATEGY COUNTY RESOURCES
INTERAGENCY PLANNING AGREEMENT
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CONTINUES

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See the following pages
for greater detail.
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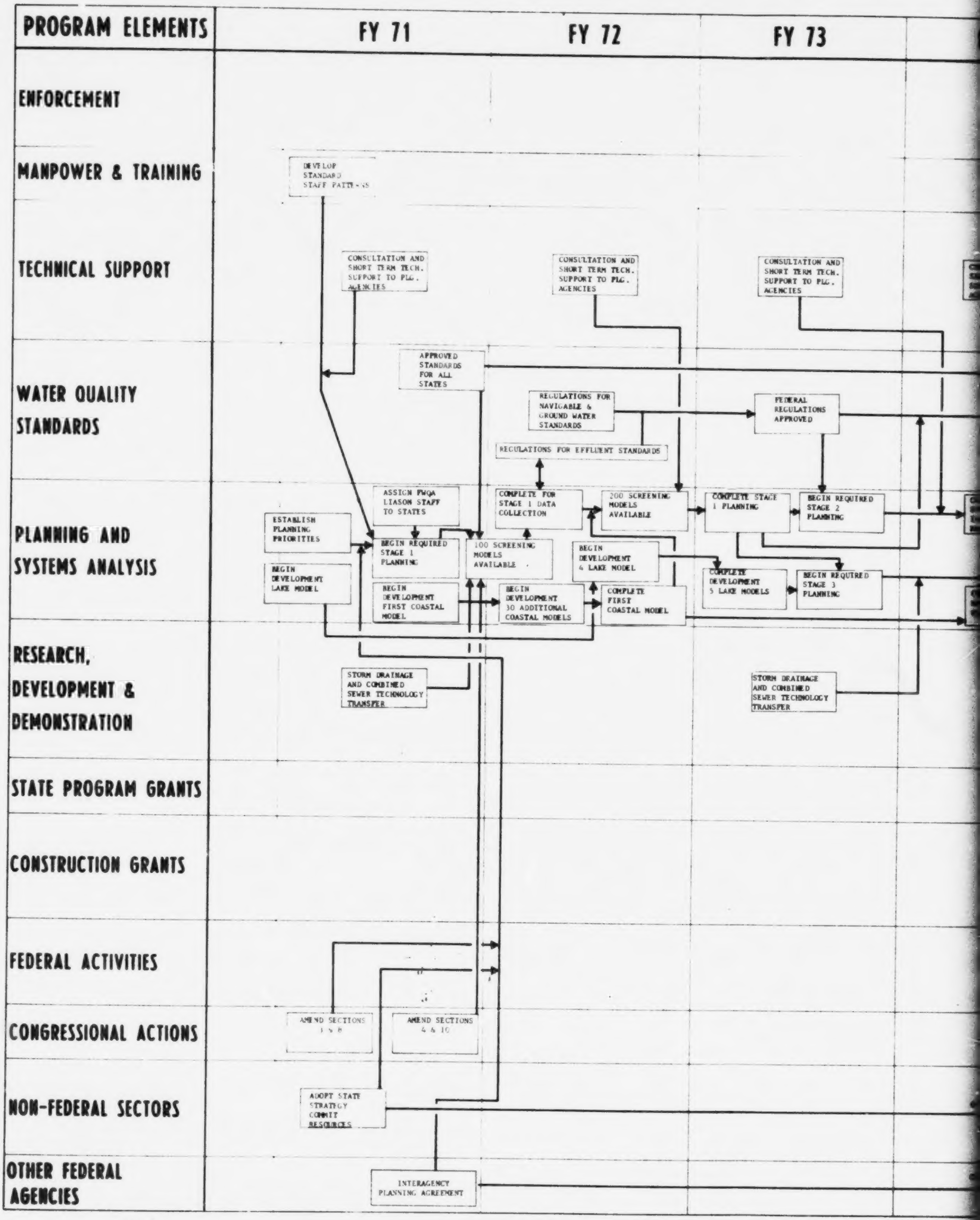
PLANNING AND SYSTEMS ANALYSIS


PROGRAM ELEMENTS
FY 71
FY 72
FY 73
ENFORCEMENT
MANPOWER & TRAINING
TECHNICAL SUPPORT
WATER QUALITY STANDARDS
PLANNING AND SYSTEMS ANALYSIS
RESEARCH, DEVELOPMENT & DEMONSTRATION
STATE PROGRAM GRANTS
CONSTRUCTION GRANTS
FEDERAL ACTIVITIES
CONGRESSIONAL ACTIONS
NON-FEDERAL SECTORS
OTHER FEDERAL AGENCIES
DEVELOP STANDARD STAFF PATTERNS
CONSULTATION AND SHORT TERM TECH. SUPPORT TO PLG. AGENCIES
CONSULTATION AND SHORT TERM TECH. SUPPORT TO PLG. AGENCIES
CONSULTATION AND SHORT TERM TECH. SUPPORT TO PLG. AGENCIES
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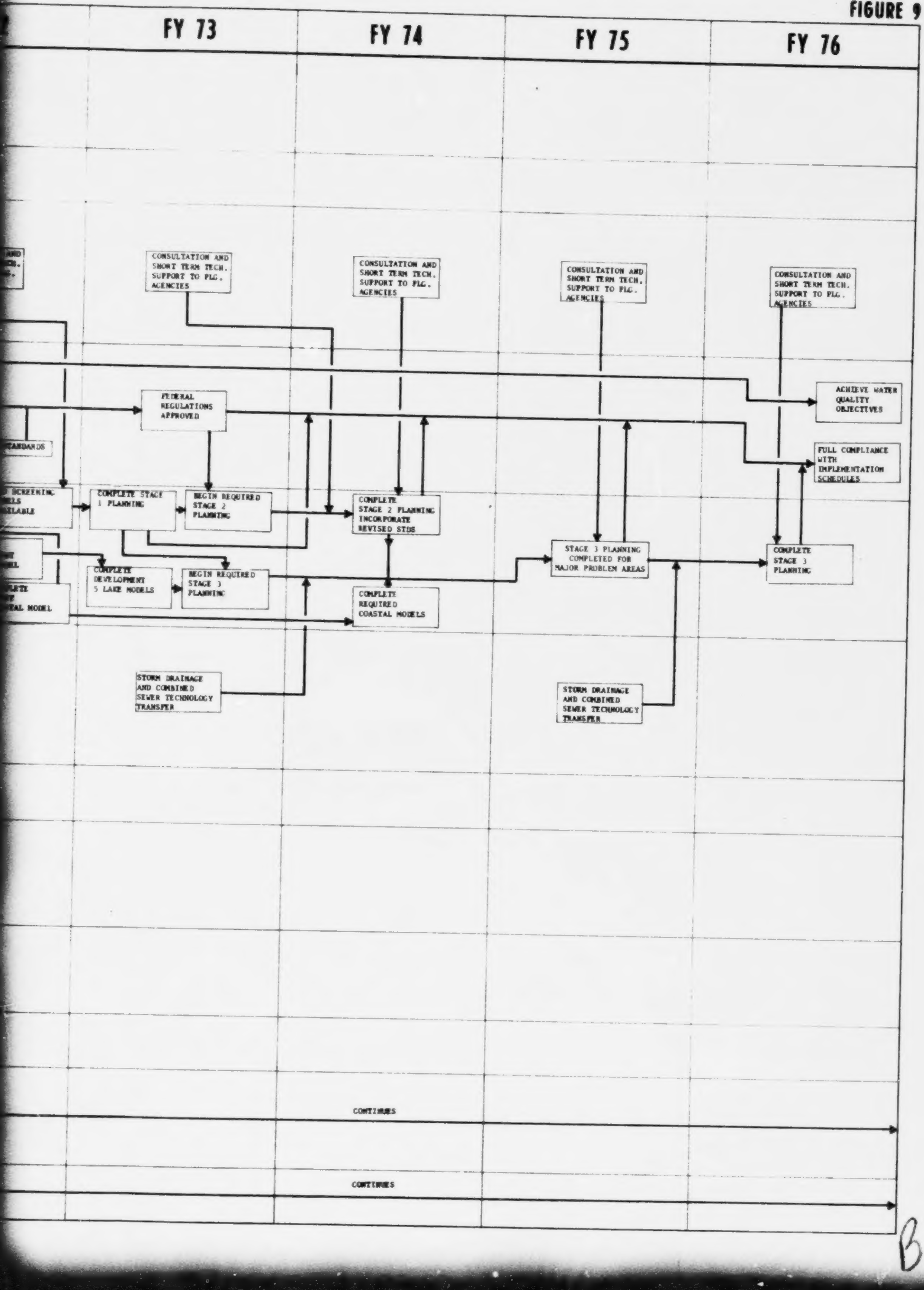
REGULATIONS FOR NAVIGABLE & GROUND WATER STANDARDS
FEDERAL REGULATIONS APPROVED
REGULATIONS FOR EFFLUENT STANDARDS
ASSIGN FWQA LIASON STAFF TO STATES
ESTABLISH PLANNING PRIORITIES
BEGIN REQUIRED STAGE 1 PLANNING
BEGIN DEVELOPMENT LAKE MODEL
BEGIN DEVELOPMENT FIRST COASTAL MODEL
100 SCREENING MODELS AVAILABLE
COMPLETE FOR STAGE 1 DATA COLLECTION
200 SCREENING MODELS AVAILABLE
BEGIN DEVELOPMENT 4 LAKE MODEL
BEGIN DEVELOPMENT 30 ADDITIONAL COASTAL MODELS
COMPLETE FIRST COASTAL MODEL
COMPLETE STAGE 1 PLANNING
BEGIN REQUIRED STAGE 2 PLANNING
COMPLETE DEVELOPMENT 5 LAKE MODELS
BEGIN REQUIRED STAGE 3 PLANNING
STORM DRAINAGE AND COMBINED SEWER TECHNOLOGY TRANSFER
STORM DRAINAGE AND COMBINED SEWER TECHNOLOGY TRANSFER
AMEND SECTIONS 3 & 8
AMEND SECTIONS 4 & 10
ADOPT STATE STRATEGY COMMIT RESOURCES
INTERAGENCY PLANNING AGREEMENT

A

STEMS ANALYSIS

FIGURE 9


FY 73
FY 74
FY 75
FY 76
AND
ECH.
TANDARDS
SCREENING
ELS
AILABLE
ENT
DEL
PLETE
TAL MODEL
CONSULTATION AND SHORT TERM TECH. SUPPORT TO PLG. AGENCIES
CONSULTATION AND SHORT TERM TECH. SUPPORT TO PLG. AGENCIES
CONSULTATION AND SHORT TERM TECH. SUPPORT TO PLG. AGENCIES
CONSULTATION AND SHORT TERM TECH. SUPPORT TO PLG. AGENCIES
FEDERAL REGULATIONS APPROVED
ACHIEVE WATER QUALITY OBJECTIVES
FULL COMPLIANCE WITH IMPLEMENTATION SCHEDULES
COMPLETE STAGE 1 PLANNING
BEGIN REQUIRED STAGE 2 PLANNING
COMPLETE STAGE 2 PLANNING INCORPORATE REVISED STDS
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COMPLETE STAGE 3 PLANNING
COMPLETE DEVELOPMENT 5 LAKE MODELS
BEGIN REQUIRED STAGE 3 PLANNING
COMPLETE REQUIRED COASTAL MODELS
STORM DRAINAGE AND COMBINED SEWER TECHNOLOGY TRANSFER
STORM DRAINAGE AND COMBINED SEWER TECHNOLOGY TRANSFER
CONTINUES
CONTINUES

B

SECTION 4
NATIONAL PROBLEM AREAS

4.1 MUNICIPAL WASTES

4.2 INDUSTRIAL AND POWER PLANT WASTES

4.3 AGRICULTURAL WASTES

4.4 OTHER URBAN WASTES

4.5 OIL AND HAZARDOUS MATERIALS SPILLS

4.6 WASTES FROM MINING AND WELLS

4.7 OTHER WASTES

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4.1 MUNICIPAL WASTES

4.1.1. SUMMARY OF PROBLEM AND APPROACH TOWARD SOLUTION

Municipal wastes rank first in terms of waste sources affecting the people of this country. Fortunately, this waste source also ranks first in terms of our ability to solve the existing or potential pollution problems it creates.

Municipal wastes, as defined here, consist of two components; (1) domestic waste discharges, and (2) discharges to municipal systems from industrial sources. In most municipal systems, the industrial waste component is a significant part of the total waste load. In assessing the overall water quality management problem, it is advantageous to support joint treatment of domestic and industrial waste where appropriate.

Wastes from municipalities are significant because: (1) they are a large source of organic material which lowers the dissolved oxygen content of water; (2) they contain large numbers of bacteria and virus creating a potential health hazard where receiving waters are used for recreation and as a public water supply, and (3) they contain nutrients that accelerate eutrophication of rivers, lakes, and estuaries.

Domestic wastes, if inadequately treated, can have the following effects: (1) closing recreation areas to swimming, fishing, and boating; (2) closing shellfish beds; (3) eliminating desirable fish species; (4) denying the use of water as a public water supply or creating taste and odor problems if a polluted water source is used for drinking water purposes; and (5) creating a nuisance and thereby reducing the aesthetic enjoyment of water and adjacent land areas.

Today, the number of sewered communities in the United States is just under 13,000 and 68 percent of the Nation's population lives in such communities. During the next five-year period, it is estimated that about 8,000 communities across the Nation will construct new, improved, or expanded sewage treatment facilities.

This construction is needed primarily to meet the established water use goals for the receiving waters. However, additional pollution abatement facilities will be required after standards have been achieved to compensate for a growing population and industrial expansion. Because treatment plants have an average life span of approximately 20 years and sewers 50 years, a continuing program of construction will be required to improve and replace facilities. The following table summarizes anticipated treatment needs.

	Number of Communities Planning New, Enlarged, Upgraded or Replacement Works	Estimated Population Served
1971	1,528	28.1 Million
1972-1976	4,375	79.8 Million
Total 1971- 1976	5,903	107.9

The waste loads from municipal systems are expected to increase nearly four times over the next 50 years. Even if municipal and industrial waste loads are substantially reduced through treatment, pollution problems may continue to exist in densely populated and highly industrialized areas where the assimilative capacity of receiving waters is exceeded. In these areas, higher and higher levels of treatment, approaching 100 percent, will probably be necessary, and water supply demands will lead to ever increasing uses of renovated waste waters.

The national cost of needed municipal waste treatment plants for the four-year period ending with FY 1974 is estimated by FWQA at $12.2 billion (July 1970). This estimate, based on a careful and detailed analysis of reported municipal needs, compares with an earlier estimate of approximately $10.0 billion.* This difference is due primarily to a series of one-time phenomena including, for example, completion of more detailed engineering plans for major metropolitan systems, Florida legislation which requires secondary treatment for ocean discharges ($300 million increase), and upgrading of State water quality standards. The cost to the Federal Government under the Federal Water Pollution Control Act, as amended, will be determined by the average participation percentage, presently 40 percent.

To meet the goal of bringing municipal sectors into compliance with water quality standards, several program activities are necessary. Various mixes of these activities can be undertaken and differing levels of effort can be devoted to these individual activities. These will determine the degree to which abatement of pollution from the municipal sector is achieved and the extent to which the goal of water quality standards compliance is obtained.

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* The Economics of Clean Water, U. S. Department of the Interior, Federal Water Pollution Control Administration, March 1970.

The basic program activity is the Construction Grants program which will assist local governments in constructing about 8,000 new, improved or expanded waste treatment facilities during the next four years. This activity will relieve the backlog of municipal waste treatment needs as they would otherwise exist in 1974, that is, the present backlog plus additional needs arising from population growth and obsolescence. With the backlog eliminated by 1974, the Construction Grants program can then concentrate on the problems arising from population growth, obsolescence, and, in some cases, subsequently upgraded water quality standards adopted to meet unanticipated water use needs. Eliminating the backlog in treatment plant construction, however, will require a substantial restudy of the Federal role, if any, in meeting future community needs for repairing, replacing, modernizing, and expanding waste treatment systems.

Treatment plants, to be effective, must be operated efficiently. FWQA's strategy includes a program of manpower development and training--operators, managers, inspectors, and designers--and issuance of technical bulletins and manuals on improved plant operations. The strategy includes RD&D in new technologies such as nutrient removal, waste water reuse and adsorption of organic materials as well as in improved methods of operating plants employing current technology. It also includes enforcement activities to prescribe treatment levels, maintain implementation schedules, establish effluent requirements, and upgrade water quality standards.

The FWQA operation and maintenance program will provide technical guidance and support of State inspection and maintenance programs, rather than a massive Federal inspection effort. The FWQA program elements will include technical bulletins and guidelines, an objective quantified inspection process, a statistically-sound system for Federal validation of State programs, and direct inspection of federally-operated facilities.

Trained manpower will be needed to operate and maintain waste treatment plants. The need for skilled operators will increase at least 30% during the planning period with an ultimate need of 32,000 persons. The need for semi-skilled and higher skill levels will also increase to reflect the increased number of secondary and tertiary treatment plants and the demand for reliable effective operations. The proposed training programs include some carried out under the Department of Health, Education, and Welfare and the Department of Labor.

The needs for skilled operators and training programs are presented in Table 8.

ESTIMATE OF EMPLOYMENT AND TRAINING NEEDS

Manpower Engaged in Water Quality Activities

Manpower Category Activity	Employment 1970	Employment 1975	Training Needs/Year New Hires Expansion	Training Needs/Year New Hires Attrition	Training Needs/Year New Hires Total	Skill Improvement	*Total
Operators							
Local	25,000	32,000	1,400	2,800	4,200	7,000	11,200
Federal	1,000	1,500	100	200	300	300	600

TABLE 8

4.1.2 ANTICIPATED ACCOMPLISHMENTS FOR PROPOSED PROGRAM

Fiscal Year 1971

-Issue design and operation and maintenance guidelines and periodically publish technical bulletins on new developments in the municipal waste treatment field.

-Issue preliminary design manuals for nutrient, suspended solids, organics and improved BOD removal processes.

-Issue improved guidelines, in cooperation with interested State and municipal organizations, to obtain uniformity in reporting of waste treatment plant needs.

-Develop improved data handling system for municipal waste treatment inventories.

Fiscal Year 1972

-Issue preliminary design manual for sludge disposal.

Fiscal Year 1973 - 1976

-Complete major restudy of costs of meeting municipal waste treatment needs, necessary for delineation of future Federal role in financing municipal waste treatment systems.

-Approve municipal grants on basis of conformity with approved basin plans.

-Provide adequate training for all waste treatment plant operators and related professional personnel.

-Demonstrate methods and design manuals for nutrient suspended solids, organics and improved BOD removal and improved sludge disposal methods.

-Provide advanced technology for waste water reuse systems.

-Achieve Federal installations' compliance with water quality standards.

-Achieve municipal waste sector compliance with water quality standards.

4.1.3 SUMMARY OF PROGRAMS

Differences in the levels of accomplishment for the optimum and proposed programs are shown in Table 9.

Major milestones and interrelationships for the two programs are identical, as shown in Figure 10.

TABLE [illegible]

MUNICIPAL WASTES
ACTIVITIES AND IMPACT

ACTIVITY	OPTIMUM PROGRAM	PROPOSED PROGRAM	IMPACT
Construction Grants			
Grants Administration	Administer the President's $10 billion program along current procedures with the exception that construction inspection will be increased.	No change	None
Design Engineering Program	Establish and periodically update design guidelines. Start the issuance of technical bulletins as a mechanism for transferring information on technological improvements.	Reduced by 2/3 in FY 1971 due to budget constraint. Same as optimum FY 1972-1976	Slight since slack will be picked up by greater emphasis on extracting design guidelines from RD & D projects
Operation and Maintenance Program	Establish and update operation/maintenance and staffing guidelines; issue manuals in cooperation with the States; inspect and evaluate the performance of Federally-assisted plants; collect information on technical assistance on operation problems.	Same as optimum	None
Re-analysis of Municipal Construction Need	Re-analyze the municipal waste treatment construction needs by the end of 1973 to determine the national program following the completion of the President's $10 billion program.	Same as optimum	None
Manpower Development and Training			
Operator Training	Provide skill improvement training to 37,500 currently employed operators and train 22,500 new operators through several different programs.	Reduced by 90% in FY 1971. Same as optimum FY 1972-1976	Number of operators trained reduced by 9,000 affecting adversely the efficient operation of some 750 treatment works ((37,500 + 22,500)/6).9)
Design Engineering Training	Provide improved underground training in design engineering to 3,600 trainees.	No program scheduled	Reduced number of trained design engineers will result in less tailored design and greater use of older technology; reduces potential effectiveness of $10 billion program by about 5%
Plant Inspector Training	Provide special course training for 3,600 plant inspection personnel.	No change	None
Manpower Planning	Provide a continuing assessment of manpower and manpower planning needs relative to municipal waste pollution abatement.	Start deferred to FY 1972	Delay will postpone improved management of manpower needs
Enforcement	Provide necessary enforcement of compliance with water quality standards (it is estimated that these might apply to about 1,300 municipalities over the next five years).	No change	None
Research and Development			
Nutrient Removal	Demonstrate fully and provide design manuals for three-phosphorous removal techniques and a nitrification technique in FY 1973, for a denitrification and an ammonia removal technique in FY 1974. Provide preliminary manuals and undemonstrated versions of these techniques during FY 1971 and 1972.	No change	None

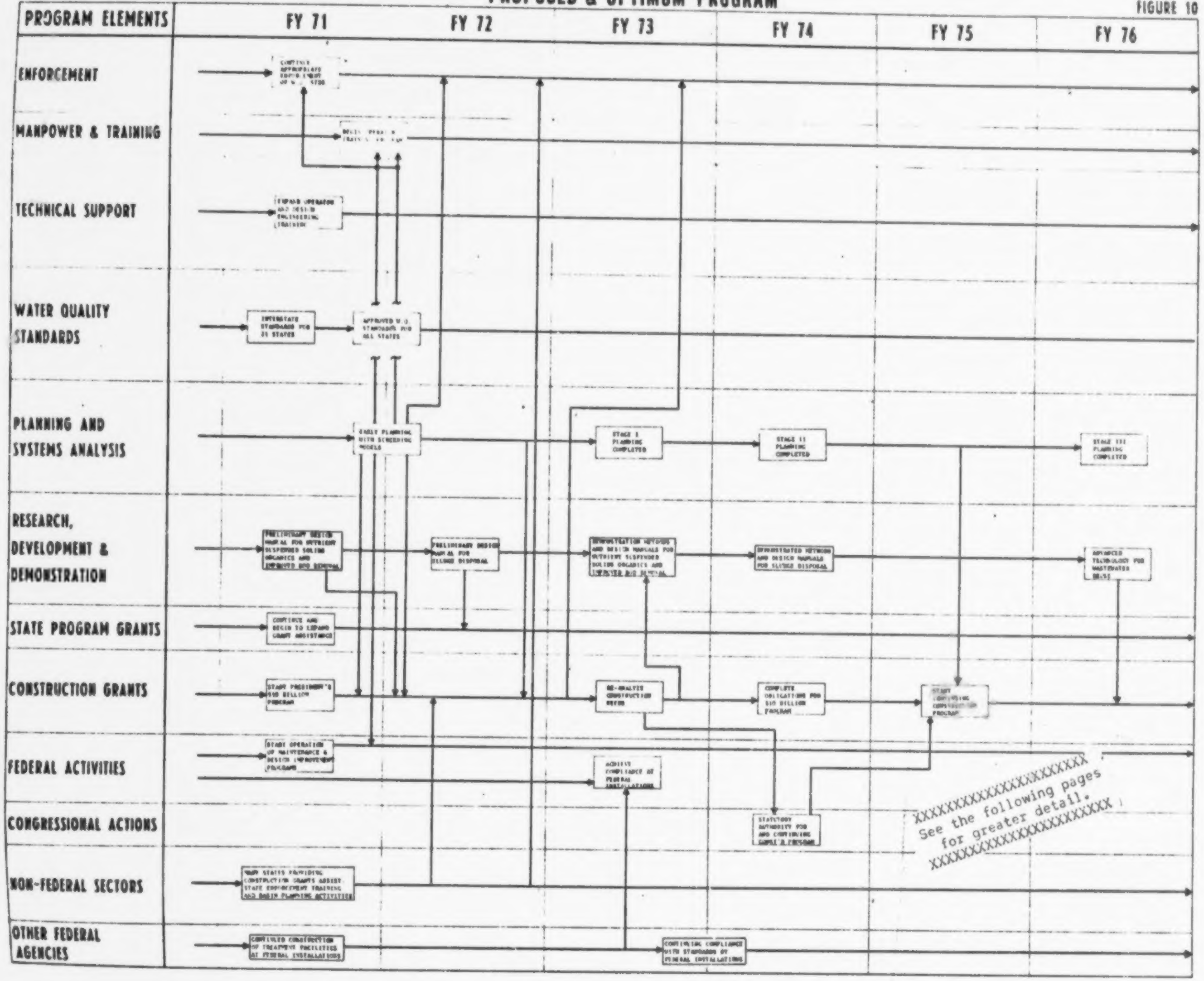
TABLE [illegible] (continued)

MUNICIPAL WASTES
ACTIVITIES AND IMPACT

ACTIVITY	OPTIMUM PROGRAM	PROPOSED PROGRAM	IMPACT
Suspended Solids and Organic Removal	Demonstrate fully and provide design manuals for - three improved suspended solids methods in FY 1973 - two activated carbon methods and an ozone method for removing toxic and other organics in FY 1973 and 1974 - three improved methods for the removal of oxygen-consuming materials in FY 1973	No change	None
	Provide preliminary manuals and undemonstrated versions of these techniques during FY 1971 and 1974.	No change	None
Ultimate Waste Disposal	Fully demonstrate and provide design manuals for three improved sludge disposal techniques in FY 1973.	No change	None
	Provide preliminary manuals and undemonstrated versions of these methods in FY 1972.		
Other Improvements in Municipal Waste Treatment Technology	Demonstrate fully and provide design manuals for a variety of new and improved technologies in the areas of - operation and maintenance - design methods and construction materials - plant instrumentatin and automation - effluent disinfection - sewer flow equalization - transportable treatment plants for subdivision installation generally before the end of FY 1974.	No change	None
Wastewater Reuse and Related Technology	Develop and demonstrate advance waste treatment and waste water reuse methods and systems, sewage flow reduction techniques and alternative municipal waste collection systems; achieve applicable results by the end of FY 1976.	Deferred start of intensive activity in demineralization and municipal reuse to FY 1972; dropped plans for public demonstration facility and deferred training facilities construction by one year; consistent with reduction in training program.	None
Basin Planning	Provide planning review of construction grants.	No change	None
	Complete stage 3 plans for all basins and other planning areas.		
Federal Activities	Attain compliance with water quality standards by Federal installations by the end of 1972.	Special funds over normal funds for assistance, review and inspection cut.	Reduced probability of achieving goal by 25% due to decrease inspections, review and technical assistance staff
Technical Support	Maintain a complete and continuously updated inventory of municipal waste sources, treatment facilities and abatement needs.	No change	None
State Program Grants	Provide a sufficient level of financial assistance to the States to enable an adequate level of activity on their part in achieving compliance with water quality standard by 1976.	No change	None

MUNICIPAL WASTES
PROPOSED & OPTIMUM PROGRAM

FIGURE 10


PROGRAM ELEMENTS
FY 71
FY 72
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FY 76
ENFORCEMENT
MANPOWER & TRAINING
TECHNICAL SUPPORT
WATER QUALITY STANDARDS
PLANNING AND SYSTEMS ANALYSIS
RESEARCH, DEVELOPMENT & DEMONSTRATION
STATE PROGRAM GRANTS
CONSTRUCTION GRANTS
FEDERAL ACTIVITIES
CONGRESSIONAL ACTIONS
NON-FEDERAL SECTORS
OTHER FEDERAL AGENCIES
CONTINUE APPROPRIATE ENFORCEMENT OF W.Q. STDS
EXPAND OPERATOR AND DESIGN ENGINEERING TRAINING
INTERSTATE STANDARDS FOR 21 STATES
APPROVED W.Q. STANDARDS FOR ALL STATES
EARLY PLANNING WITH SCREENING MODELS
STAGE I PLANNING COMPLETED
STAGE II PLANNING COMPLETED
STAGE III PLANNING COMPLETED
PRELIMINARY DESIGN MANUAL FOR NUTRIENT SUSPENDED SOLIDS ORGANICS AND IMPROVED BOD REMOVAL
PRELIMINARY DESIGN MANUAL FOR SLUDGE DISPOSAL
DEMONSTRATION NETWORK AND DESIGN MANUALS FOR NUTRIENT SUSPENDED SOLIDS ORGANICS AND IMPROVED BOD REMOVAL
DEMONSTRATED NETWORK AND DESIGN MANUALS FOR SLUDGE DISPOSAL
ADVANCED TECHNOLOGY FOR WASTEWATER REUSE
CONTINUE AND BEGIN TO EXPAND GRANT ASSISTANCE
START PRESIDENT'S $10 BILLION PROGRAM
RE-ANALYZE CONSTRUCTION NEEDS
COMPLETE OBLIGATIONS FOR $10 BILLION PROGRAM
START CONTINUING CONSTRUCTION PROGRAM
START OPERATION OF MAINTENANCE & DESIGN IMPROVEMENT PROGRAM
ACHIEVE COMPLIANCE AT FEDERAL INSTALLATIONS
STATUTORY AUTHORITY FOR AND CONTINUING CONGRESS'S PROGRAM
MANY STATES PROVIDING CONSTRUCTION GRANTS ASSIST STATE ENFORCEMENT TRAINING AND BASIN PLANNING ACTIVITIES
CONTINUED CONSTRUCTION OF TREATMENT FACILITIES AT FEDERAL INSTALLATIONS
CONTINUING COMPLIANCE WITH STANDARDS BY FEDERAL INSTALLATIONS

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for greater detail.
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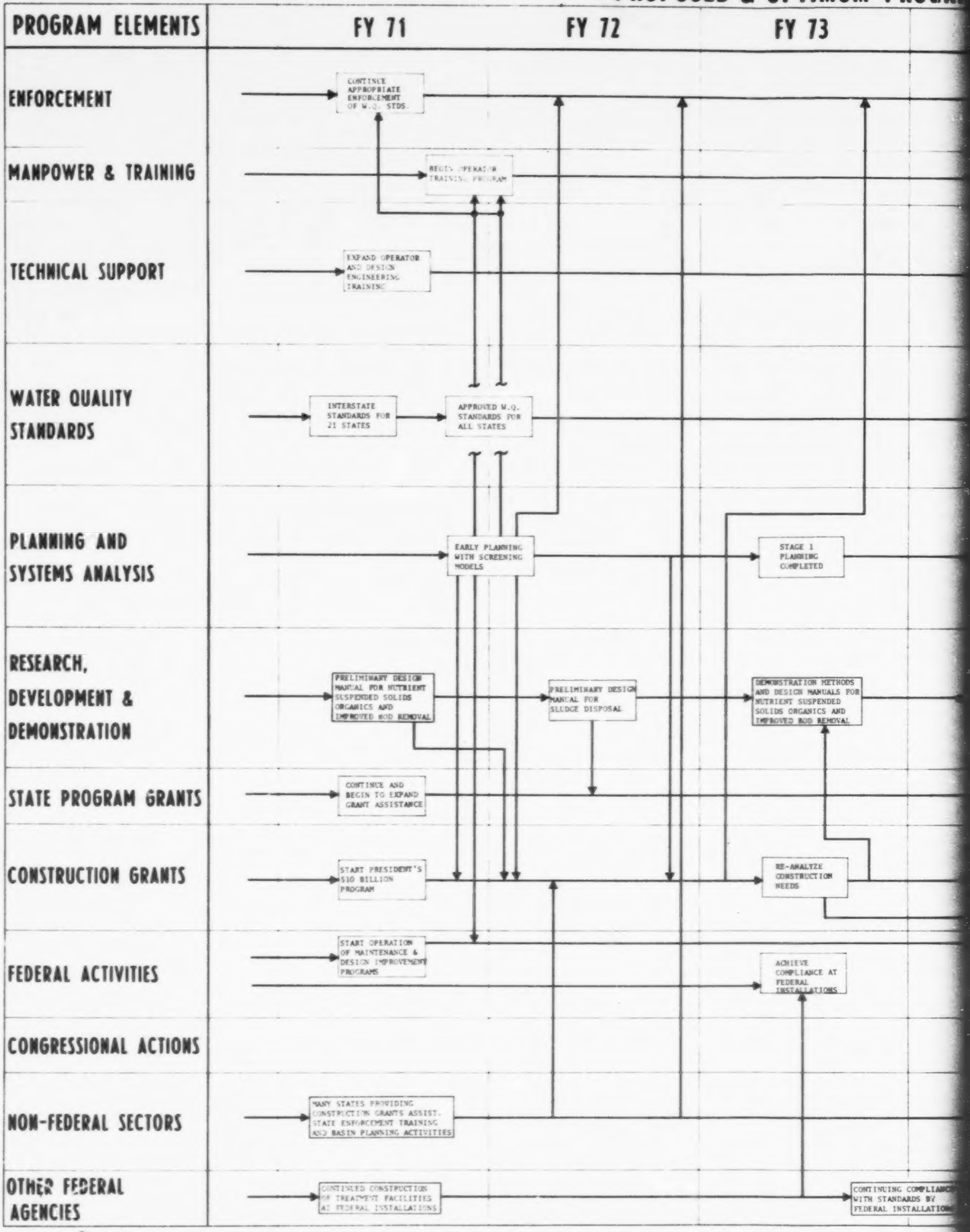
MUNICIPAL WASTES
PROPOSED & OPTIMUM PROGR


PROGRAM ELEMENTS
FY 71
FY 72
FY 73
ENFORCEMENT
MANPOWER & TRAINING
TECHNICAL SUPPORT
WATER QUALITY STANDARDS
PLANNING AND SYSTEMS ANALYSIS
RESEARCH, DEVELOPMENT & DEMONSTRATION
STATE PROGRAM GRANTS
CONSTRUCTION GRANTS
FEDERAL ACTIVITIES
CONGRESSIONAL ACTIONS
NON-FEDERAL SECTORS
OTHER FEDERAL AGENCIES
CONTINUE APPROPRIATE ENFORCEMENT OF W.Q. STDS.
BEGIN OPERATOR TRAINING PROGRAM
EXPAND OPERATOR AND DESIGN ENGINEERING TRAINING
INTERSTATE STANDARDS FOR 21 STATES
APPROVED W.Q. STANDARDS FOR ALL STATES
EARLY PLANNING WITH SCREENING MODELS
STAGE 1 PLANNING COMPLETED
PRELIMINARY DESIGN MANUAL FOR NUTRIENT SUSPENDED SOLIDS ORGANICS AND IMPROVED BOD REMOVAL
PRELIMINARY DESIGN MANUAL FOR SLUDGE DISPOSAL
DEMONSTRATION METHODS AND DESIGN MANUALS FOR NUTRIENT SUSPENDED SOLIDS ORGANICS AND IMPROVED BOD REMOVAL
CONTINUE AND BEGIN TO EXPAND GRANT ASSISTANCE
START PRESIDENT'S $10 BILLION PROGRAM
RE-ANALYZE CONSTRUCTION NEEDS
START OPERATION OF MAINTENANCE & DESIGN IMPROVEMENT PROGRAMS
ACHIEVE COMPLIANCE AT FEDERAL INSTALLATIONS
MANY STATES PROVIDING CONSTRUCTION GRANTS ASSIST. STATE ENFORCEMENT TRAINING AND BASIN PLANNING ACTIVITIES
CONTINUED CONSTRUCTION OF TREATMENT FACILITIES AT FEDERAL INSTALLATIONS
CONTINUING COMPLIANCE WITH STANDARDS BY FEDERAL INSTALLATIONS

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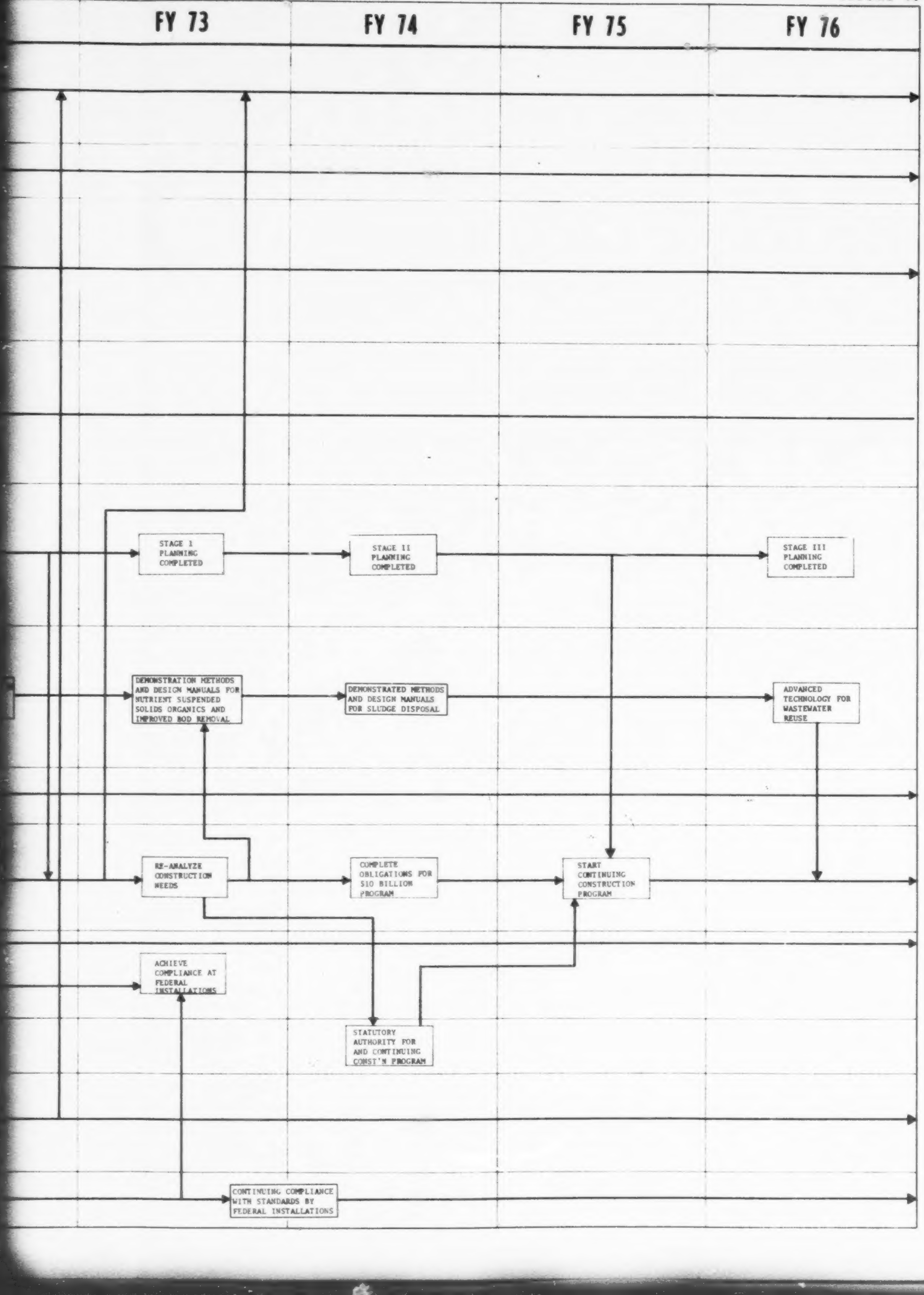
MUNICIPAL WASTES
ROPOSED & OPTIMUM PROGRAM

FIGURE 10


FY 73
FY 74
FY 75
FY 76
STAGE I PLANNING COMPLETED
STAGE II PLANNING COMPLETED
STAGE III PLANNING COMPLETED
DEMONSTRATION METHODS AND DESIGN MANUALS FOR NUTRIENT SUSPENDED SOLIDS ORGANICS AND IMPROVED BOD REMOVAL
DEMONSTRATED METHODS AND DESIGN MANUALS FOR SLUDGE DISPOSAL
ADVANCED TECHNOLOGY FOR WASTEWATER REUSE
RE-ANALYZE CONSTRUCTION NEEDS
COMPLETE OBLIGATIONS FOR $10 BILLION PROGRAM
START CONTINUING CONSTRUCTION PROGRAM
ACHIEVE COMPLIANCE AT FEDERAL INSTALLATIONS
STATUTORY AUTHORITY FOR AND CONTINUING CONST'N PROGRAM
CONTINUING COMPLIANCE WITH STANDARDS BY FEDERAL INSTALLATIONS

4.2 INDUSTRIAL AND POWER PLANT WASTES

4.2.1 SUMMARY OF PROBLEM AND APPROACH TOWARD ITS SOLUTION

In terms of deleterious effects on the receiving waters, industrial wastes are the second greatest pollution problem and impose a higher BOD load than do municipal wastes. In terms of population adversely affected, industrial wastes rank third, after municipal and agricultural wastes.

In addition to the sheer volume of industrial wastes, the variety, and often hazardous nature of these materials contribute to the complexity and difficulty of treatment requirements. Industrial pollutants include such dissolved components as acids, alkalies, salts, nutrients, toxic materials, and organic compounds, and such suspended components as organic solids, inorganic solids, and oils and grease. The geographical aspects of the total problem are nationwide, with the most severe effects in the industrialized North Atlantic, Great Lakes, Ohio, and Texas-Gulf Rio Grande water resource regions. The pollution impact of a given industry or industry group is heaviest in the part or parts of the United States in which it is centered.

Increasing evidence shows that a substantial--if not a major--portion of the recent pressure on public waste treatment capital originates in the demand for capacity to handle wastes of industrial origin. It is roughly estimated that factories and people make approximately equal demands on public facilities that transmit and treat liquid wastes.

Domestic waste loadings tend to vary on an hourly basis with morning and early evening peaks. Some industrial discharges have pronounced cyclical patterns. Seasonal operations occur in many industrial sectors, but the five-day work week is still the standard for industry.

One problem peculiar to industrial wastes as opposed to municipal wastes is the difficulty in obtaining an accurate inventory of volumes and specific contaminants from each source.

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One reason is the reluctance of industry to release effluent data that might reveal confidential information relating to processing a volume of productions.

The program for the five-year period, FY 1972-1976, focuses on an industrial waste control effort to establish appropriate standards with strong and systematic enforcement. This will be augmented by an industrial waste inventory and a research, development, and demonstration program to produce the waste treatment technology not presently available to enable compliance with water quality standards. Under the proposed program, enforcement is an essential element. A large proportion of the enforcement budget, almost 60 percent is allocated to the control of industrial pollution.

Water quality standards play the key role in defining operational goals for abating industrial wastes. Resolving criteria for heat discharges and toxic materials is particularly essential.

Effluent requirements provide a key element in the entire strategy. Criteria and requirements will help Basin Planning arrive at meaningful implementation plans; will aid Federal Activities and States in license and permit review; and will contribute to a positive and effective enforcement program. These elements are essential for solving industrial pollution problems and adhering to the water quality standards and implementation plans.

Planning provides for a coordinated, consistent attack on water quality problems within a river basin and assures that schedules for treatment levels are directed to attaining goals.
In a given area, abatement schedules for industrial discharges must be geared to those for municipal discharges to avoid negating the water quality improvements possible under the municipal construction grant program. Plans will be developed in basins on a priority basis and will be oriented to take immediate and continuing account of development of technology and effluent requirements.

The Water Quality Improvement Act of 1970 requires a certification of compliance with applicable water quality standards as a prerequisite to issuing a Federal license or permit. Application of these authorities to provisions of the 1899 Refuse Act, administered by the Corps of Engineers, extends this authority to most industrial plants with direct discharges.

Direct Federal licensing of power plants by the Federal Power Commission and the Atomic Energy Commission provides the vehicle for FWQA to assure compliance with water quality standards and effluent requirements.

Research on toxic and heat effects is essential to defining operational goals. This is treated in detail in the paper on water quality standards. Predictive techniques for assessing thermal impacts are necessary for reviewing proposed siting of power plants and industrial works disposing of waste heat and for determining required actions at existing plants. These activities provide needed support to Federal Activities license and permit reviews and to Basin Planning activities.

4.2.2 ANTICIPATED ACCOMPLISHMENTS FOR PROPOSED PROGRAM

Fiscal Year 1971

- Issue permits for discharges to navigable waters for new establishments.
- Issue Federal permits for new power plants contingent on meeting applicable water quality standards.

Fiscal Year 1972

- Issue Federal permits for 10 percent of existing establishments discharging to navigable waters.

Fiscal Year 1973-1976

- Incorporate effluent requirements into water quality standards.
- Demonstrate technology for meeting effluent requirements.
- Complete industrial waste inventory.

Fiscal Year 1977

- Achieve full compliance with water quality standards by all sources of industrial wastes.

4.2.3 SUMMARY OF PROGRAMS

Differences in the levels of accomplishment for the optimum and proposed programs are shown in Table 10. Major milestones and interrelationships for the two programs are shown in Figures 11 and 12 respectively.

TABLE 10

INDUSTRY AND POWER
ACTIVITIES AND IMPACT

ACTIVITY	OPTIMUM PROGRAM	PROPOSED PROGRAM	IMPACT
Enforcement	Bring action against industrial dischargers violating permits, effluent requirements or implementation schedules at a rate sufficient to bring compliance of all industrial sources by end of FY 1976. Major thrust of enforcement activities will be in industry problem solution.	Slight reduction	Increased emphasis on permit review on Federal activities with enforcement support should mitigate adverse impacts.
	Provide legal support to permit review decisions.	Inadequate budget for FY 1971; funded in FY 1972-1976	Lack of early legal support could reduce long-term effectiveness by 10%
Research, Development and Demonstration	Effluent criteria research by end of FY 1971.	No change	
Industrial RD&D Treatment Criteria Research	Prepare state-of-the-art papers for polluting industries by end of FY 1972. Emphasis on: metal products, chemicals, petroleum, paper, food, and textiles· development of support to water quality standards effluent regulations; enforcement actions and planning by developing standards of best performance including new methods under development. Major new emphasis on "near 100%" and "closed loop" systems.	Intensive effort deferred one year beginning in FY 1972	Impact on Efficiency Standards softened by special Technology Support studies. Major impact will be increased costs to private sector in meeting compliance regulations with less cost-effective technology.
	Demonstrate selected technology by end of FY 1972	No change	None
Analytical Methods	Develop predictive tools for analyzing temperature distributions:		
	Streams - complete and transfer current work FY 1971.	No change	None
	Lakes and Reservoirs - expand effort to have working models by end of FY 1971	No change	None
	Estuarine Zone - Ocean - Develop predictive capability by end of FY 1972	No change	None
Thermal	Develop new methods of heat dissipation to reduce costs and avoid environmental disbenefits of current techniques. Evaluate environmental consequences of advanced power generation technology. Develop and demonstrate methods and uses of waste heat; agricultural season extension, central heat systems. Demonstrate temperature monitoring systems related to operational control through feed back.	No change	None
Criteria for Water Quality Standards	Develop explicit effects for criteria establishment for industrial waste products, particularly heat and toxic materials by the end of FY 1971.	No change	None
Manpower Development and Training	Develop and present short courses for State review personnel and engineers, chemists and decision makers to assist States in permit reviews and to accelerate technological transfer of control methods.	Project deferred one year; to begin in FY 1972	Impact of less trained personnel is to reduce effectiveness of permit review and certification procedures. Delay could impact 8,000 permit reviews for new establishments.

TABLE 10 (continued)

INDUSTRY AND POWER
ACTIVITIES AND IMPACT

ACTIVITY	OPTIMUM PROGRAM	PROPOSED PROGRAM	IMPACT
Manpower Development & Training (continued)	Support State staffing needs with two year semi-professional training programs in industrial and sewered waste control. Content geared to State and local regulatory programs.	Project deferred one year; to begin in FY 1972	Delay State effectiveness in controlling industrial wastes.
	Perform manpower needs studies to determine the supply and demand of various skills categories to assist industry in planning and carrying out its own operator training programs.	Deferred one year. Begin in FY 1972	Small probability (10%) of inadequate labor supply to effectively staff industrial works
Technical Support			
Inventory and Effluent Data	Inventory industrial discharges to provide base information for monitoring design, basin planning and computerized effluent standard and permit system by end of FY 1972.	No change	Failure to accomplish could reduce effectiveness of planning construction grants review by 50%
	Develop detailed effluent data on a priority basis for Basin Planning, keyed to match model development.	No change	Failure to accomplish could reduce effectiveness of planning by 75%
Field Studies	Carry out field investigations into the long term biological effects of heat discharge under actual operating conditions by FY 1975.	Project deleted	Responsibility for providing data should be made part of licensing and permit conditions
State Program Grants	Provide incentive, guidance and support to implementing State certification procedures for industrial discharges (FY 1971) and effluent requirements (FY 1972).	No specific additional funds provided for this purpose	Absence of special funds may lead to inadequate staffing and review of discharge permits. Could reduce probablity of reaching compliance by FY 1976 by 25%
Water Quality Standards (Note: Includes only items of major impact on industrial problem solution)	Key Tasks: Establish criteria for toxic materials and thermal discharges. Develop effluent standards for industrial discharges.	No change	None
Basin Planning and Systems Analysis (Note: Same as above for RBP)	Key Tasks: Develop municipal-industrial stream models in 200 priority basins by end of FY 1972 and for all major basins by FY 1975. Translate effluent standards into explicit implementation schedules by mid-FY 1975.	No change if FY 1971 supplemental approved	
Federal Activities			
License and Permit Activities under Section 21, FWPC Act	Implement for hazardous materials regulations developed under Section 12(a) in FY 1971.	No change	None
	Process permit applications for estimated 4000 new establishments each year beginning in FY 1971. Bring under permit approximately 38,000 existing manufacturing establishments and 500 thermal generating plants in priority order based on impact, implementation plan and enforcement requirements by end of FY 1975.	Reduced by 2/3 in FY 1971; full funding FY 1972-1976	Reduction will extend compliance time by approximately one year
	Provide Federal leadership to State agencies for certification procedures and for Federal licensing and permit activities including provision of Federal review capability for water quality effects by end of FY 1971.		

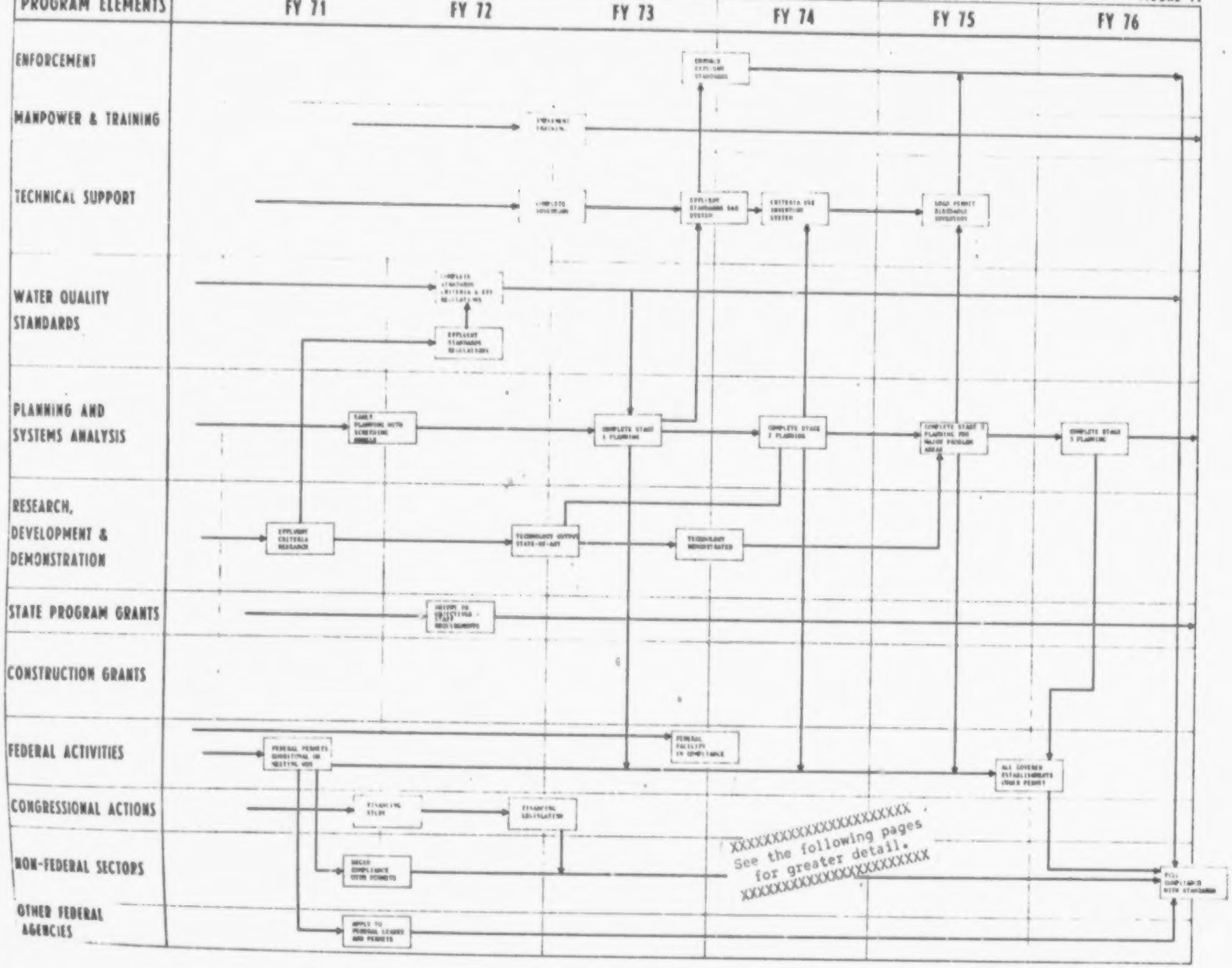
TABLE 10 (continued)

INDUSTRY AND POWER
ACTIVITIES AND IMPACT

ACTIVITY	OPTIMUM PROGRAM	PROPOSED PROGRAM	IMPACT
Federal Industrial Establishments under E.O. 11507	Inventory needs; review corrective programs; perform site review and technical consultation. Implement self-monitoring system. Beginning in FY 1973 implement FWQA inspection program.	No special industrial program provided; lower level funding provided under general Executive Order 11507 project under Water Quality Standards	Less effective program will reduce certainty of compliance by 50%

INDUSTRIAL WASTE
OPTIMUM PROGRAM

FIGURE 11


PROGRAM ELEMENTS
FY 71
FY 72
FY 73
FY 74
FY 75
FY 76
ENFORCEMENT
MANPOWER & TRAINING
TECHNICAL SUPPORT
WATER QUALITY STANDARDS
PLANNING AND SYSTEMS ANALYSIS
RESEARCH, DEVELOPMENT & DEMONSTRATION
STATE PROGRAM GRANTS
CONSTRUCTION GRANTS
FEDERAL ACTIVITIES
CONGRESSIONAL ACTIONS
NON-FEDERAL SECTORS
OTHER FEDERAL AGENCIES
ENFORCE EFFLUENT STANDARDS
CRITERIA USE INVENTORY SYSTEM
LOAD PERMIT DISCHARGE INVENTORY
EFFLUENT STANDARDS REGULATIONS
EARLY PLANNING WITH SCREENING MODELS
COMPLETE STAGE 1 PLANNING
COMPLETE STAGE 2 PLANNING
COMPLETE STAGE 3 PLANNING FOR MAJOR PROBLEM AREAS
COMPLETE STAGE 3 PLANNING
EFFLUENT CRITERIA RESEARCH
TECHNOLOGY OUTPUT STATE-OF-ART
TECHNOLOGY DEMONSTRATED
FEDERAL FACILITY IN COMPLIANCE
FINANCING STUDY
FINANCING LEGISLATION
BEGIN COMPLIANCE WITH PERMITS
APPLY TO FEDERAL LEASES AND PERMITS
ALL COVERED ESTABLISHMENTS UNDER PERMIT
FULL COMPLIANCE WITH STANDARDS

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See the following pages
for greater detail.
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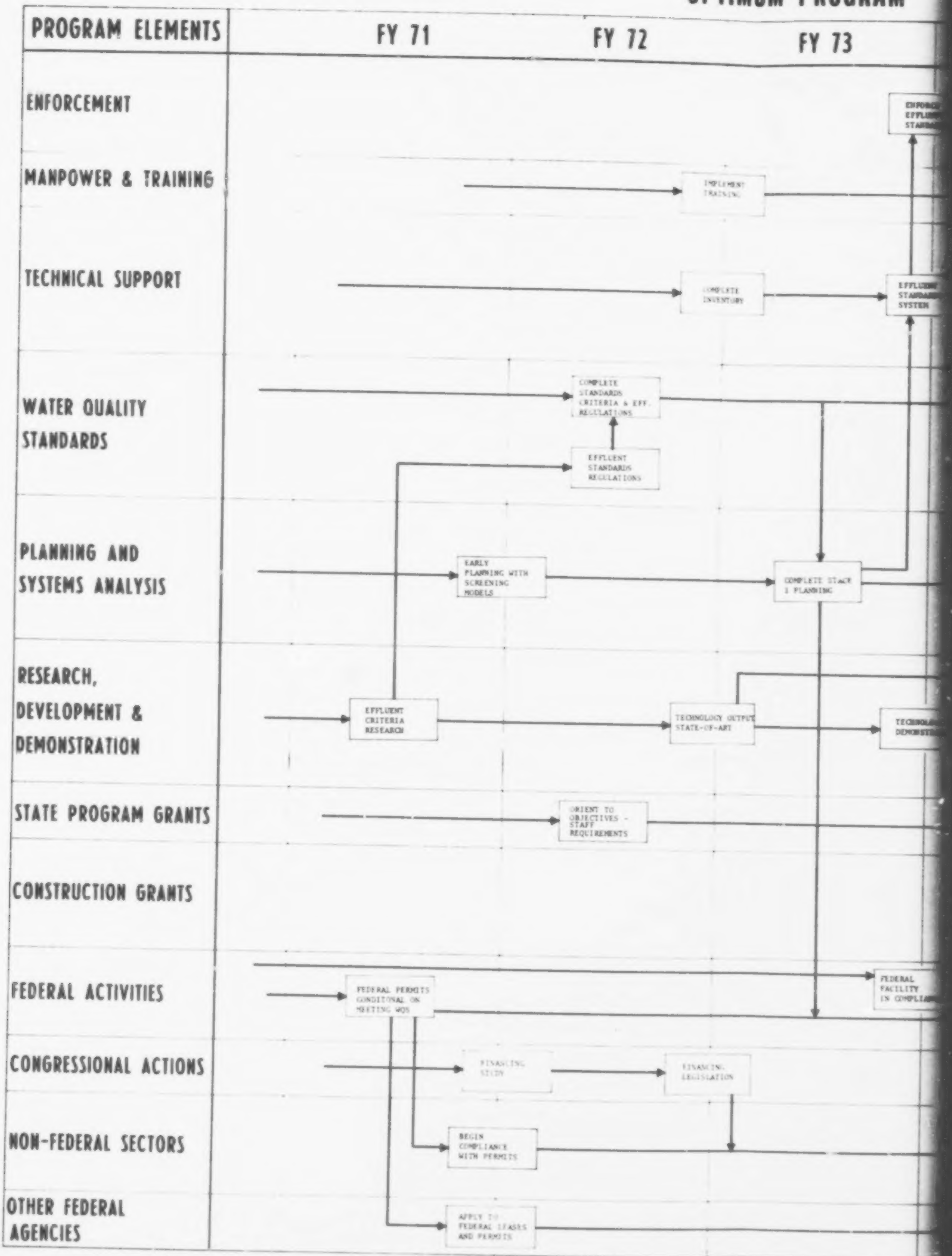
INDUSTRIAL WASTE
OPTIMUM PROGRAM


PROGRAM ELEMENTS
FY 71
FY 72
FY 73
ENFORCEMENT
MANPOWER & TRAINING
TECHNICAL SUPPORT
WATER QUALITY STANDARDS
PLANNING AND SYSTEMS ANALYSIS
RESEARCH, DEVELOPMENT & DEMONSTRATION
STATE PROGRAM GRANTS
CONSTRUCTION GRANTS
FEDERAL ACTIVITIES
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NON-FEDERAL SECTORS
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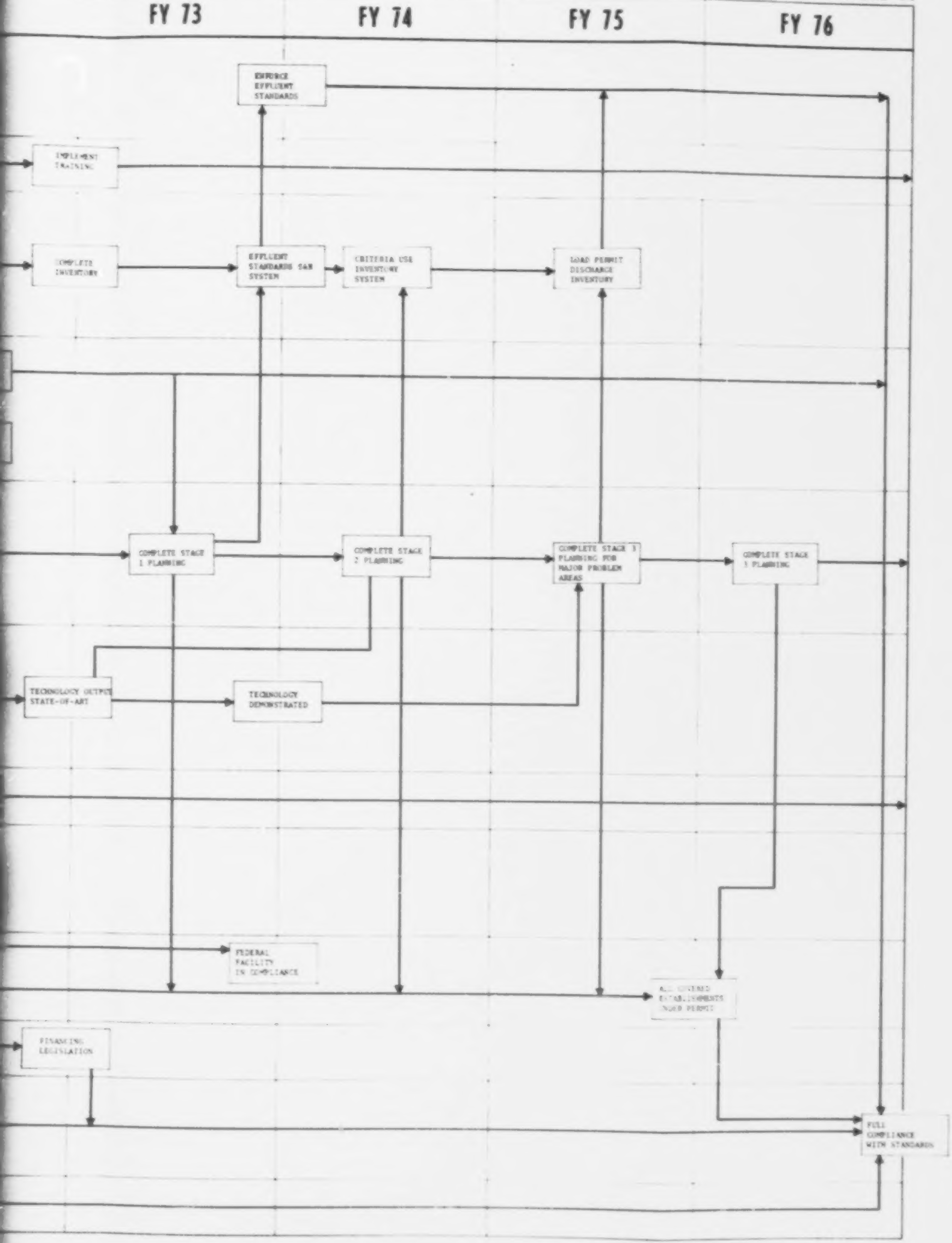
FINANCING STUDY
FINANCING LEGISLATION
BEGIN COMPLIANCE WITH PERMITS
APPLY TO FEDERAL LEASES AND PERMITS

INDUSTRIAL WASTE OPTIMUM PROGRAM

FIGURE 11


FY 73
FY 74
FY 75
FY 76
ENFORCE EFFLUENT STANDARDS
IMPLEMENT TRAINING
COMPLETE INVENTORY
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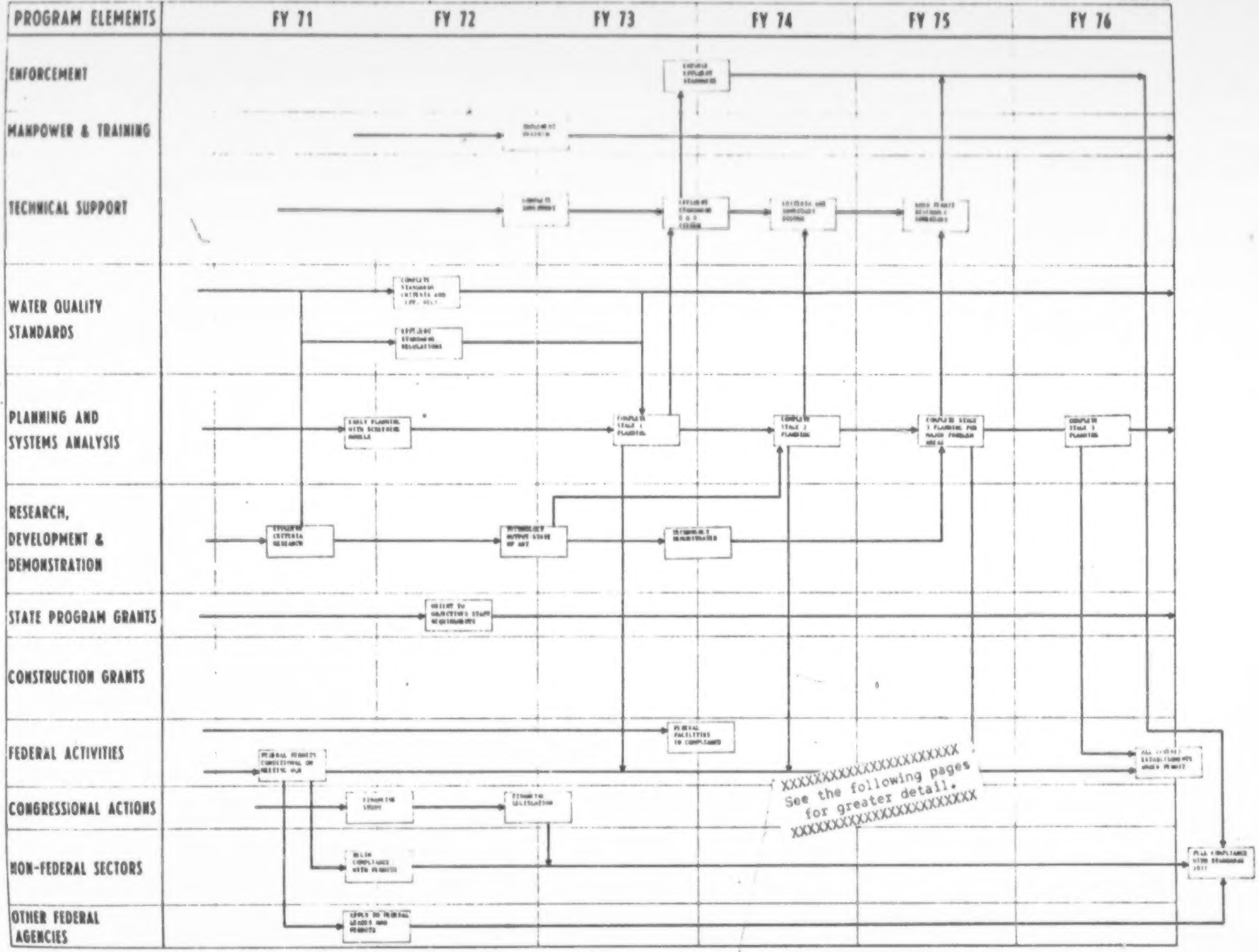
CRITERIA USE INVENTORY SYSTEM
LOAD PERMIT DISCHARGE INVENTORY
COMPLETE STAGE 1 PLANNING
COMPLETE STAGE 2 PLANNING
COMPLETE STAGE 3 PLANNING FOR MAJOR PROBLEM AREAS
COMPLETE STAGE 3 PLANNING
TECHNOLOGY OUTPUT STATE-OF-ART
TECHNOLOGY DEMONSTRATED
FEDERAL FACILITY IN COMPLIANCE
ALL COVERED ESTABLISHMENTS UNDER PERMIT
FINANCING LEGISLATION
FULL COMPLIANCE WITH STANDARDS

INDUSTRIAL WASTE
PROPOSED PROGRAM

FIGURE 12


PROGRAM ELEMENTS
FY 71
FY 72
FY 73
FY 74
FY 75
FY 76
ENFORCEMENT
MANPOWER & TRAINING
TECHNICAL SUPPORT
WATER QUALITY STANDARDS
PLANNING AND SYSTEMS ANALYSIS
RESEARCH, DEVELOPMENT & DEMONSTRATION
STATE PROGRAM GRANTS
CONSTRUCTION GRANTS
FEDERAL ACTIVITIES
CONGRESSIONAL ACTIONS
NON-FEDERAL SECTORS
OTHER FEDERAL AGENCIES
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COMPLETE STAGE 3 PLANNING FOR MAJOR PROBLEM AREAS
COMPLETE STAGE 3 PLANNING
FEDERAL FACILITIES TO COMPLIANCE
FINANCING STUDY
FINANCING LEGISLATION
BEGIN COMPLIANCE WITH PERMITS
FULL COMPLIANCE WITH STANDARDS 1977

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See the following pages
for greater detail.
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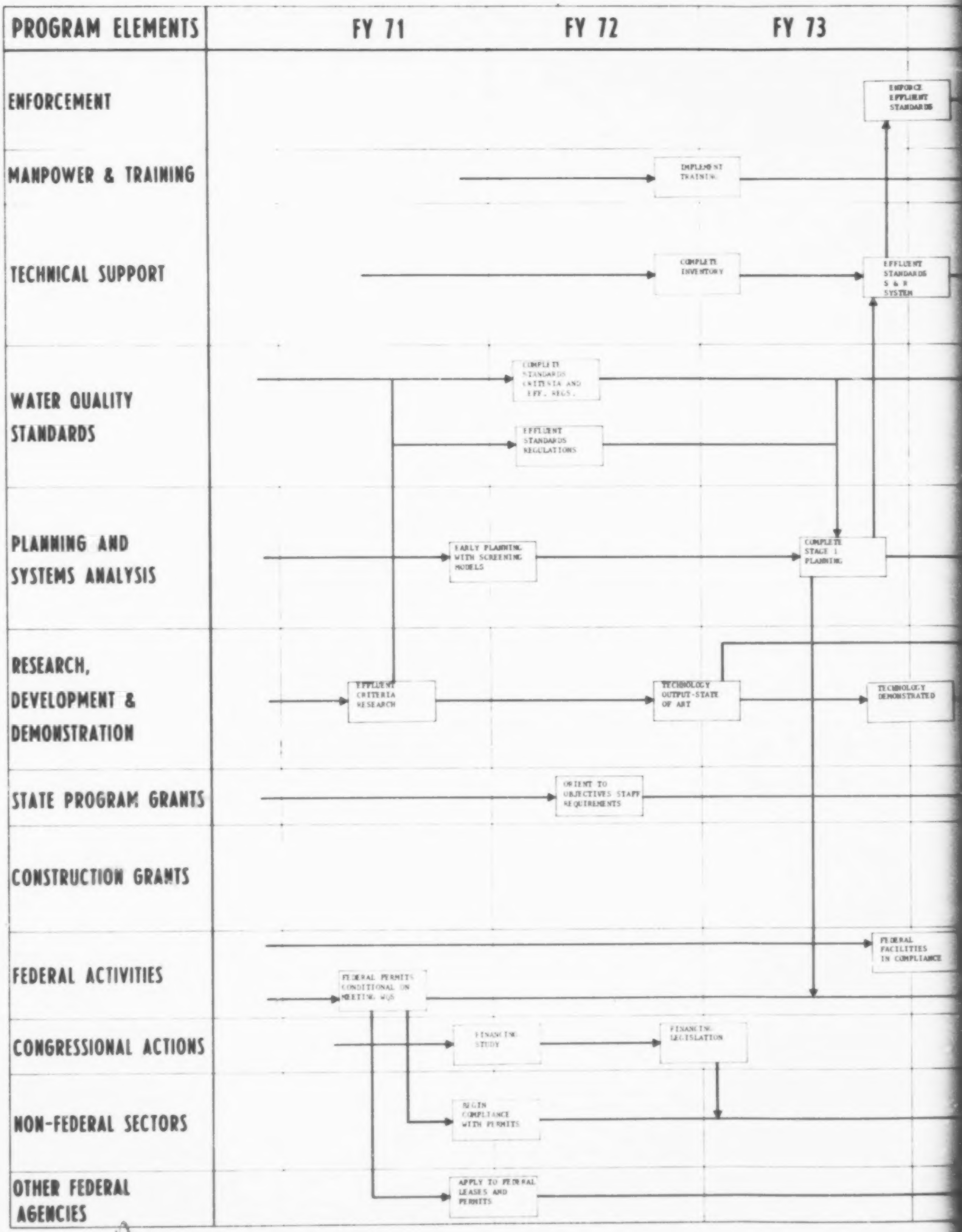
INDUSTRIAL WASTE PROPOSED PROGRAM


PROGRAM ELEMENTS
FY 71
FY 72
FY 73
ENFORCEMENT
ENFORCE EFFLUENT STANDARDS
MANPOWER & TRAINING
IMPLEMENT TRAINING
TECHNICAL SUPPORT
COMPLETE INVENTORY
EFFLUENT STANDARDS S & R SYSTEM
WATER QUALITY STANDARDS
COMPLETE STANDARDS CRITERIA AND EFF. REGS.
EFFLUENT STANDARDS REGULATIONS
PLANNING AND SYSTEMS ANALYSIS
EARLY PLANNING WITH SCREENING MODELS
COMPLETE STAGE 1 PLANNING
RESEARCH, DEVELOPMENT & DEMONSTRATION
EFFLUENT CRITERIA RESEARCH
TECHNOLOGY OUTPUT-STATE OF ART
TECHNOLOGY DEMONSTRATED
STATE PROGRAM GRANTS
ORIENT TO OBJECTIVES STAFF REQUIREMENTS
CONSTRUCTION GRANTS
FEDERAL ACTIVITIES
FEDERAL FACILITIES IN COMPLIANCE
FEDERAL PERMITS CONDITIONAL ON MEETING WQS
CONGRESSIONAL ACTIONS
FINANCING STUDY
FINANCING LEGISLATION
NON-FEDERAL SECTORS
BEGIN COMPLIANCE WITH PERMITS
OTHER FEDERAL AGENCIES
APPLY TO FEDERAL LEASES AND PERMITS

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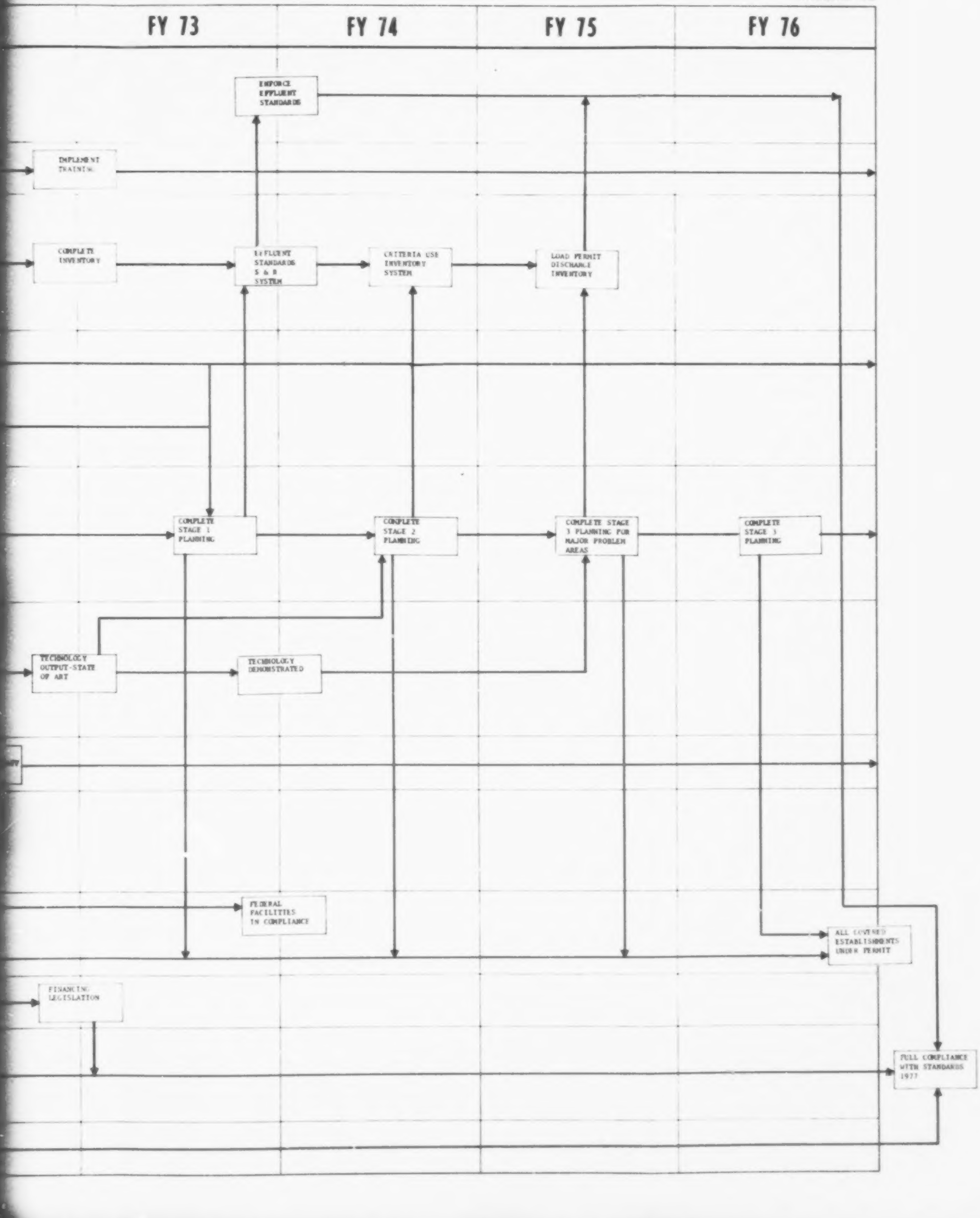
INDUSTRIAL WASTE PROPOSED PROGRAM

FIGURE 12


FY 73
FY 74
FY 75
FY 76
ENFORCE EFFLUENT STANDARDS
IMPLEMENT TRAINING
COMPLETE INVENTORY
EFFLUENT STANDARDS S & R SYSTEM
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COMPLETE STAGE 2 PLANNING
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TECHNOLOGY DEMONSTRATED
FEDERAL FACILITIES IN COMPLIANCE
ALL COVERED ESTABLISHMENTS UNDER PERMIT
FINANCING LEGISLATION
FULL COMPLIANCE WITH STANDARDS 1977

4.3 AGRICULTURAL WASTES

4.3.1 SUMMARY OF PROBLEM AND STRATEGY FOR ITS SOLUTION

Agricultural waste problems include pollutants related to sediment, animal wastes, plant nutrients, forest and crop residues, inorganic salts and minerals, infectious agents and allergens, and agricultural chemicals. Many of these pollutants are controllable with adequate improved agricultural and natural resource management practices; pesticides are controllable through restrictions in use; other pollutants require additional research to determine immediate and long-term effects and appropriate treatment or control measures.

A deterioration in water quality results from growing crops where the combination of land and climate makes irrigation necessary. The consumptive use of water in irrigation-based agriculture in the sixteen arid western and northern States contributes more than one-half ton of salt per year to waterways for every acre of irrigated land. Irrigation practices also contribute nutrients and pesticides to receiving waters. Decreased fresh water discharges increase salinity levels in estuaries with attendant biological dislocation aggravated through diminished circulation. Reduced flows in rivers during critical irrigation periods may increase pollution control costs for other wastes because of a need for treatment capacity used only on a seasonal basis.

Major advances in livestock production have exchange range and pasture feeding practices for confined feeding operations. Today, three-fourths of the Nation's livestock are finish-fed in confined feedlots. Total production of animal wastes is approximately 1.7 billion tons, some of which enters receiving waters. Problems caused by this waste from cattle, poultry, and hog production are widespread, but are most significant in the far midwest. Runoff from these operations is ten to one hundred times more concentrated than raw domestic wastes. Dissolved oxygen deficits caused by feedlot runoff pollution were directly implicated in 87 reported incidents of fish kills in the Nation in 1969, with a total kill of nearly 1.5 million fish. Fecal bacterial counts as high as 40

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million per 100 milliliter of sample have been reported following "slug" runoff from cattle feedlots. This contrast with a typical acceptable count of 4,000 per 100 milliliter for certain body-contact recreational uses.

Environmental contamination from pesticide-herbicide runoff or accidental contamination is an increasingly serious problem. Application practices, the persistence of these pesticides, and the numerous natural pathways for biological reconcentration have contaminated significant quantities of marketable fish. These, in turn, may produce long-term effects on other consumers, including humans. Large areas of the country have been closed to commercial and sport fishing. Thousands of acres of shellfishing areas have been affected by pesticide runoff.

The use of pesticides is growing at a tremendous rate. The total value of all pesticides produced in this country was $440 million in 1964, and $12 billion in 1969. Herbicide sales rose 271 percent between 1963 and 1969. It is estimated that insecticides will almost double in use by 1975, and herbicide use will increase to more than double that of insecticides during the same period. In 1964, 470 million pounds of insecticides were used on 83 million acres of land and 97 million acres of agricultural land were treated with herbicidal chemicals.

Agricultural lands also contribute about half of the four billion tons of sediment that reach water courses each year; each ton carries with it one pound of phosphorus. This amount of phosphorus would be sufficient to stimulate algal production in 10 acre-feet of water.

Pollution from forestry and logging operations principally affects the Northwest and Southeast regions. Silt, solids and organic leachates are the principal contaminants from forestry and logging operations. Studies have shown that sediment loads increase from 7 to 70,000 parts per million following clear-cut logging operations. Five to ten percent of silt pollution comes from forests and associated rangelands.

Control and abatement of agricultural pollution will be achieved through improved and new technology and management practices for control of pollutants. This knowledge will be transferred to the governmental and private parties who are in position to put the controls into operations and will help establish and enforce compliance with water quality standards.

Inventories of the sources and the character of the effects of agricultural wastes will provide a basis for initiating enforcement actions and developing basin control technology research. Through research efforts, water quality criteria for pesticides and manuals prescribing control measures for feedlot and salinity control will be developed. Water quality standards will be established for pesticides and updated for the other aspects of agricultural pollution.

4.3.2 ANTICIPATED ACCOMPLISHMENTS OF PROPOSED PROGRAM

Fiscal Year 1971

- Complete feedlot and salinity problem inventories.

Fiscal Year 1972

- Identify hazardous pollutants.

Fiscal Year 1973 - 1976

- Complete reports on pesticides application and criteria.
- Control pesticide runoff from Federal activities.
- Institute training programs for persons in positions to control pollution from agricultural sources.
- Develop criteria for pesticides and water quality standards updated for all types of agricultural pollution.
- Enact legislation for complete control of pesticides.
- Develop State programs incorporating controls for salinity, sediment, nutrient, and persistent pesticides.
- Achieve full compliance with standards of large feeding operators.
- Achieve full compliance with pesticide regulations.
- Achieve significant compliance for agricultural runoff and forestry and logging.

4.3.3 SUMMARY OF PROGRAMS

Major milestones and interrelationships for the optimum and proposed programs are shown in Figures 13 and 14 respectively.

Differences in the levels of accomplishments for the two programs are shown in Table 11.

TABLE 11

AGRICULTURAL WASTES-ANIMAL FEEDLOTS ACTIVITIES AND IMPACT

ACTIVITY	OPTIMUM PROGRAM	PROPOSED PROGRAM	IMPACT
Enforcement			
Compliance	Initiate actions to ensure compliance with water quality standards.	Reduce effort 10%.	Minor, probably 30% or less, effect on full compliance
Manpower & Training			
Training	Determine training needs and develop and institute training programs for feedlot owners/operators, and other key people in selected areas of government and industry	Delayed two years.	Minor
Technical Support			
Current situation problems	Conduct indepth field studies in at least three dissimilar geographical areas to develop a quantitative knowledge of pollution problem and make recommendations for solution.	Delayed one year.	Critical area for determining R&D, training and enforcement needs. Also will delay feedlot pollution control one year.
Abatement and control practices	Develop criteria for acceptable abatement and control practices for feedlots.	Delayed one year.	Will delay control of feedlot pollution one year.
Technical assistance	Stimulate use of applicable waste collection mechanisms and proper housekeeping practices. Encourage through technical leadership and bulletins the establishment of State programs for pollution control which will emphasize resource conservation.	Delayed one year.	As above.
Inventory	Complete, and continue to update, inventory of confined feeding installations with locations in regard to watercourses, number of animals confined, soil type and condition, and facility, if any, for storage and disposal of animal waste.	Delayed one year.	This is critical item for developing feedlot control and will delay control one year.
Research, Development and Demonstration			
Biological treatment	Develop and demonstrate biological treatment methods for runoff from feedlots; compile a manual of abatement practices by late FY 1973.	No change	None
Technological manuals	Develop technological manuals for biological systems and operations management in FY 1973; develop similar manuals for advanced systems for feedlot runoff control in FY 1975.	No change	None
Waste conversion, reuse and by-product recovery	Develop and demonstrate methods of recycling, reuse and by-product recovery of animal feedlot wastes.	By-product recovery methods delayed two years. Incineration methods one year.	One to two year's delay in control measures. Reduce input to technology manuals in FY 1975.
Tertiary treatment	Develop and demonstrate tertiary treatment systems for use in confined animal feedlots to substantially and effectively remove nutrients and color.	Delayed two years.	
Facilities Design and Management	Investigate, develop and demonstrate physical design and facilities management of feedlots to alleviate runoff.	No change	None
State Program Grants			
Feedlot Control	Assure that goals in feedlot control are reflected in State program plans.	Normal grants administration will accomplish these tasks without additional resources.	None

TABLE 11 (continued)

AGRICULTURAL WASTES-ANIMAL FEEDLOTS
ACTIVITIES AND IMPACT

ACTIVITY	OPTIMUM PROGRAM	PROPOSED PROGRAM	IMPACT
Regulations and Legislation	Encourage States to develop State feedlot registration regulations or legislation.	Normal grants administration will accomplish these tasks without additional resources.	These tasks will be accomplished under FAC tasks identified elsewhere.
Federal Activities Coordination			
Affects of Federal Operations	Determine the degree to which other agencies' programs affect feedlot operations and the extent to which these programs are or can be used to control pollution.	Will not be done except as collateral information obtained in coordinating with other agencies.	Minor
Provide Information	Provide agencies with pollution control information; consult on new technology, and encourage participation in pollution control training.	Delayed one year.	Minor
Non-Federal Sector			
Feedlot Registration Regulation	This task must be performed to accomplish control.	No Federal funding involved.	

Table 11 (Continued)

AGRICULTURAL WASTES - IRRIGATION AND RURAL RUNOFF
ACTIVITIES AND IMPACT

ACTIVITY	OPTIMUM PROGRAM	PROPOSED PROGRAM	IMPACT
Enforcement			
Compliance	Initiate actions to ensure compliance with water quality standards.	Effort reduced 10%	Minor, probably 3 percent or less, effect on compliance.
Manpower and Training			
Irrigation Return Flow	Institute a program for training field representatives in inspection and testing techniques applicable to return flow irrigation effluent.	No Change	None
Farm Operators	Develop and institute eight regional programs for training farm operators in advanced environment-oriented farming methods. (Cooperation with USDA/OE)	No Change	None
Rural Runoff	Institute a specialized training program and, in cooperation with the Office of Public Information, develop an educational program for control of chemical pollutants originating in runoff from rural lands.	No Change	None
Technical Support			
Salinity Problem Inventory	Develop an inventory of and evaluate salinity problem from irrigation return flows; report by June 1972.	Delayed one year.	Salinity control program delayed one year.
Characterize Magnitude of Problems	Conduct technical studies to characterize magnitude of salinity, nutrient and sediment problems on 20 watersheds; selected, in part, as a result of the inventory; report in FY 1974.	Delayed one year.	Salinity control program delayed one year.
Release of Pesticides	Develop and submit to Congress a report on methods to control the release of pesticides into the environment in order to insure effective implementation of pesticide water quality criteria; report in FY 1972. Section 4.3	Effort reduced to one-third in FY 1971.	Implementation of pesticide water quality criteria and report to the Congress due in FY 1972 will be delayed into FY 1973.
Pesticide Registration	Participate in review of pesticide registration and in the coordination and review of Federal pesticide programs.	Delayed one year.	Objective of complete control of pesticide pollution in FY 1973 will not be achieved.
Technical Assistance	Respond to acute pesticide pollution problems.	Delayed one year.	As above and severe environmental damage occurs as result of acute problems.
Monitor Pesticides	Implement a monitoring program for continuing national assessment of pesticide levels associated with streams, lakes, estuaries and coastal waters.	Delayed one year.	Objective of complete control of pesticide pollution in FY 1973 will not be achieved.
Water Quality Standards			
Standards	Seek revision of all State implementation plans to include nonpoint sources.		
Research, Development, and Demonstration			
Salinity	Demonstrate measures and practices to prevent or control salinity pollution.	Delayed one year.	Control of salinity delayed one year.

Table 11 (Continued)

ACTIVITY	OPTIMUM PROGRAM	PROPOSED PROGRAM	IMPACT
Nutrients	Demonstrate methods to treat, control or prevent nutrient pollution. A limited number of control measures will be available by FY 1973 and predictive methodology in rural runoff will be available in FY 1975.	Effort reduced to 50 percent in FY 1971.	No great impact on overall program.
Sediment	Develop and demonstrate sediment prevention and control measures.	Delayed two years.	Full compliance with standards will not be achieved in FY 1976.
Pesticides	Develop and demonstrate measures to prevent or control pesticides pollution.	Delayed two years.	Objective of complete control of pesticide pollution in FY 1973 will be reduced and overall control delayed two years.
Federal Activities Coordination			
Land Use	Sustain Federal program direction with other agencies such as the Bureau of Reclamation, the Bureau of Land Management and the Department of Agriculture to examine the environmental consequence of their programs and to develop approaches to reduce sediment, pesticides and other toxic materials, and nutrient loadings.	Delayed two years.	Achieving water quality standards through Federal operations will be delayed two years.
Resource Development	Undertake detailed analysis of existing Bureau of Reclamation, Department of Agriculture, TVA, Corps of Engineers regulations to insure that resource development projects are consistent with water quality standards.		
Agricultural Permits	Make full utilization of Section 21 (b) to assure inclusion of salinity control measures in all agricultural-related permits.		

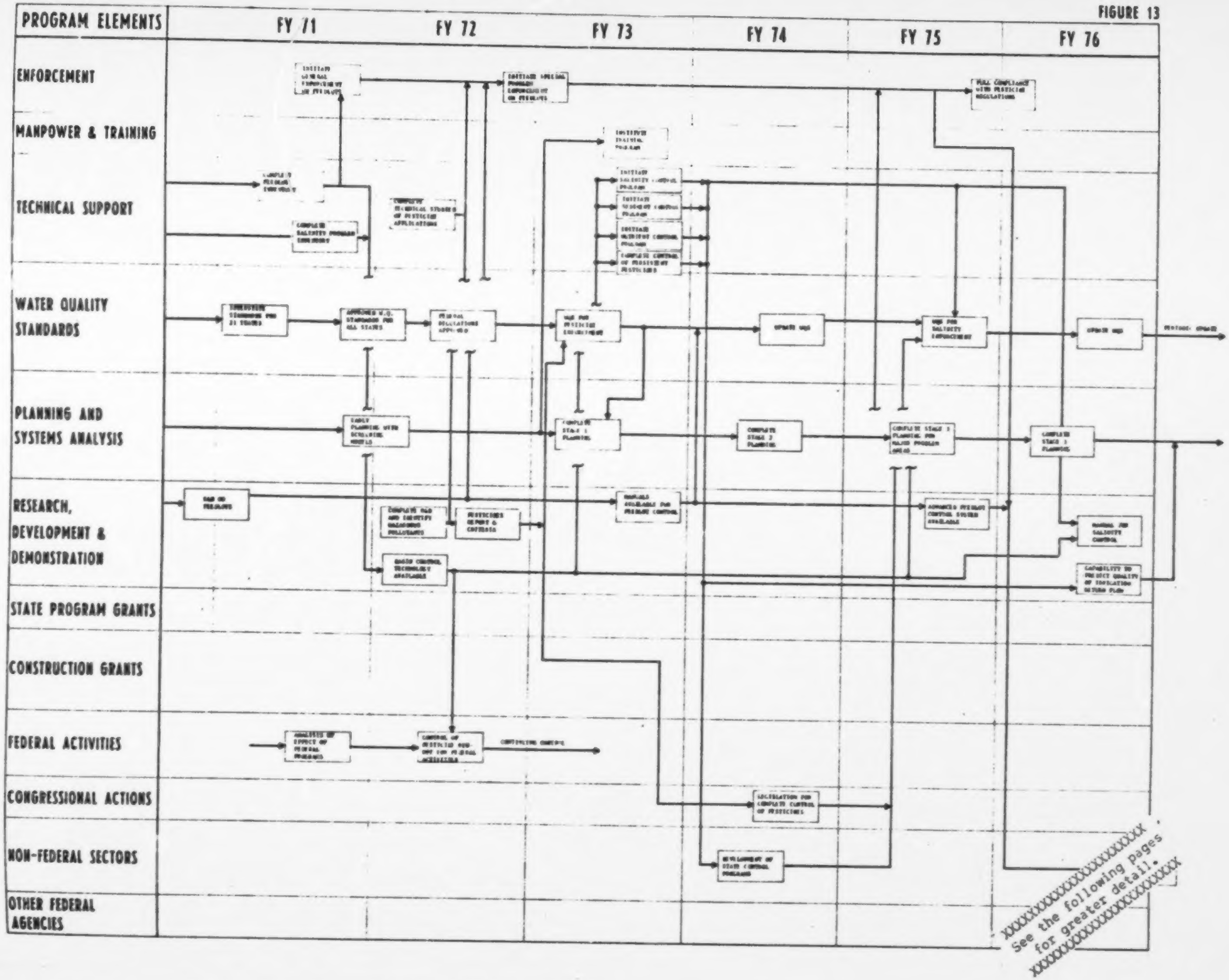
TABLE 11 (continued)

AGRICULTURAL WASTES - FORESTRY AND LOGGING
ACTIVITIES AND IMPACT

ACTIVITY	OPTIMUM PROGRAM	PROPOSED PROGRAM	IMPACT
Enforcement			
Compliance	Initiate actions to ensure compliance with water quality standards.	Effort reduced 10%	Minor
Manpower & Training			
Training	Institute training program in cooperation with plans to be developed by Federal Activities Coordination in association with U.S. Forest Service and Bureau of Land Management.	Delayed two years.	Minor
Technical Support			
Monitoring System	Expand existing monitoring system in appropriate areas to evaluate effects of forestry practices on water quality.	No change	None
Assistance to States	Provide technical assistance to States in developing and implementing remedial and control programs.	No change	None
Pollutional effects of logs	Characterize the pollutional effects from water storage and handling practices of logs on tidelands, marine, estuarine and fresh waters.	Delayed one year.	Minor
Water Quality Standards			
Establish standards	Key tasks of establishing instream and runoff standards for sediment, nutrients, salinity, pesticides, and toxic materials on forest lands are included in Section 2.0, Water Quality Standards.		
Basin Planning			
Planning	Key task of integrating planning for pollution abatement of rural and forested areas is included in Section 3.0, River Basin Planning.	To be carried out by Basin Plans	None
Research, Development and Demonstration			
Sediment, organic and nutrient runoff	Develop and demonstrate technology to prevent and control sediment, organic litter and nutrient runoff associated with forestry and logging operations.	Subelements delayed one to two years.	Will delay Program for Public Lands one to two years and reduce F & L 1976 compliance by 40 percent.
Federal Activities Coordination			
Program for public lands	Review forest practices program with National Park Service and U.S. Forest Service, Bureau of Land Management and Bureau of Reclamation to develop, implement and sustain corrective program on public lands.	Delayed one year.	Will delay for one year changes in forestry practices on Federal lands which would have significant impact on water quality.

AGRICULTURE
OPTIMUM PROGRAM

FIGURE 13


PROGRAM ELEMENTS
FY 71
FY 72
FY 73
FY 74
FY 75
FY 76
ENFORCEMENT
MANPOWER & TRAINING
TECHNICAL SUPPORT
WATER QUALITY STANDARDS
PLANNING AND SYSTEMS ANALYSIS
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STATE PROGRAM GRANTS
CONSTRUCTION GRANTS
FEDERAL ACTIVITIES
CONGRESSIONAL ACTIONS
NON-FEDERAL SECTORS
OTHER FEDERAL AGENCIES
FULL COMPLIANCE WITH PESTICIDE REGULATIONS
INITIATE TRAINING PROGRAM
COMPLETE SALINITY PROGRAM INVENTORY
COMPLETE TECHNICAL STUDIES OF PESTICIDE APPLICATIONS
INITIATE SALINITY CONTROL PROGRAM
INITIATE SEDIMENT CONTROL PROGRAM
INITIATE NUTRIENT CONTROL PROGRAM
COMPLETE CONTROL OF PERSISTENT PESTICIDES
APPROVED W.Q. STANDARDS FOR ALL STATES
FEDERAL REGULATIONS APPROVED
WQS FOR PESTICIDE ENFORCEMENT
UPDATE WQS
WQS FOR SALINITY ENFORCEMENT
UPDATE WQS
CONTINUING UPDATE
COMPLETE STAGE 1 PLANNING
COMPLETE STAGE 2 PLANNING
COMPLETE STAGE 3 PLANNING FOR MAJOR PROBLEM AREAS
COMPLETE STAGE 3 PLANNING
COMPLETE R&D AND IDENTIFY HAZARDOUS POLLUTANTS
PESTICIDES REPORT & CRITERIA
BASIC CONTROL TECHNOLOGY AVAILABLE
ADVANCED PESTICIDE CONTROL SYSTEM AVAILABLE
MANUAL FOR SALINITY CONTROL
CAPABILITY TO PREDICT QUALITY OF IRRIGATION RETURN FLOW
ANALYSIS OF EFFECT OF FEDERAL PROGRAMS
CONTROL OF PESTICIDE RUN-OFF FOR FEDERAL ACTIVITIES
CONTINUING CONTROL
LEGISLATION FOR COMPLETE CONTROL OF PESTICIDES
DEVELOPMENT OF STATE CONTROL PROGRAMS

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See the following pages
for greater detail.
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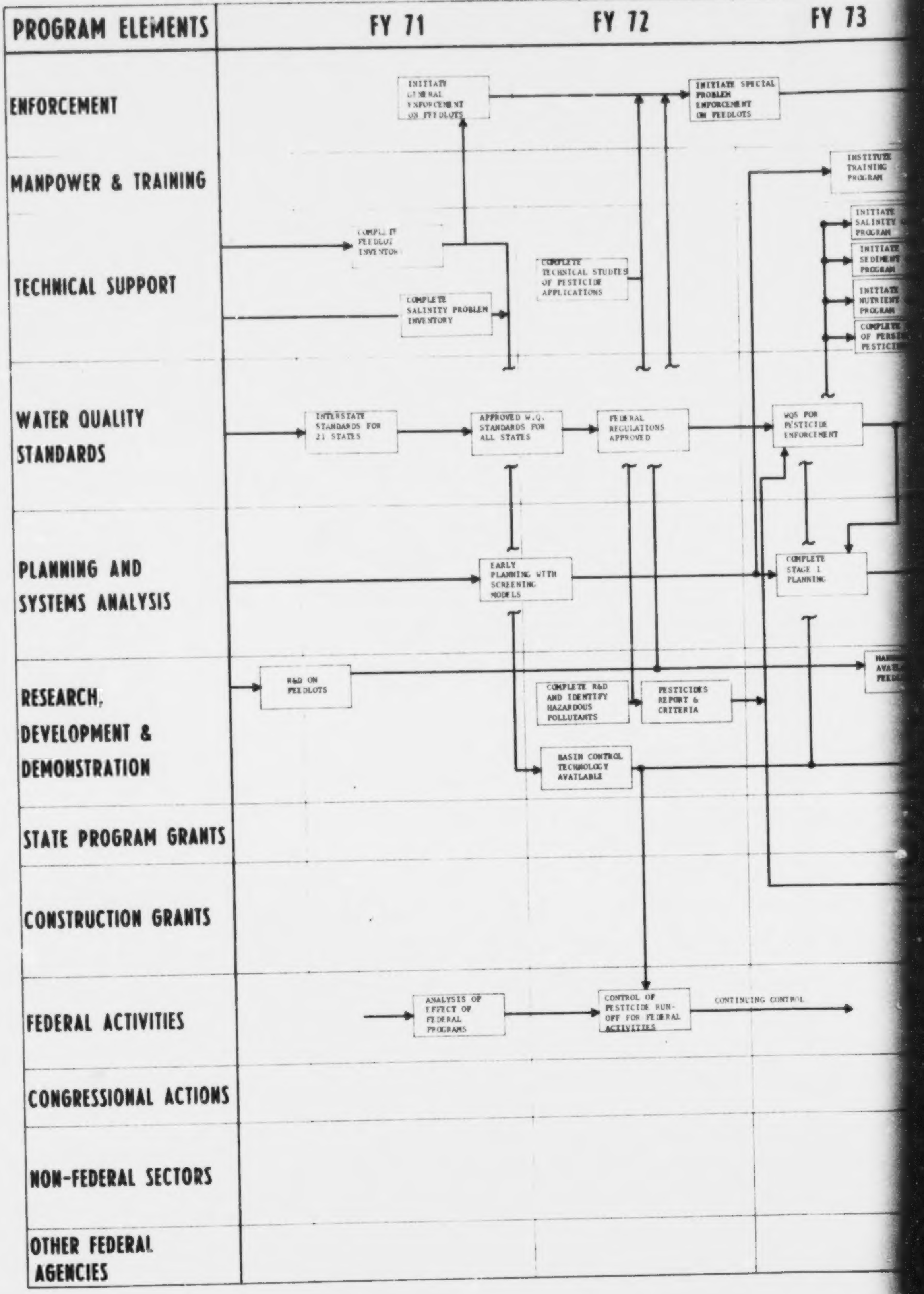
AGRICULTURE OPTIMUM PROGRAM


PROGRAM ELEMENTS
FY 71
FY 72
FY 73
ENFORCEMENT
MANPOWER & TRAINING
TECHNICAL SUPPORT
WATER QUALITY STANDARDS
PLANNING AND SYSTEMS ANALYSIS
RESEARCH, DEVELOPMENT & DEMONSTRATION
STATE PROGRAM GRANTS
CONSTRUCTION GRANTS
FEDERAL ACTIVITIES
CONGRESSIONAL ACTIONS
NON-FEDERAL SECTORS
OTHER FEDERAL AGENCIES
INITIATE GENERAL ENFORCEMENT ON FEEDLOTS
INITIATE SPECIAL PROBLEM ENFORCEMENT ON FEEDLOTS
INSTITUTE TRAINING PROGRAM
COMPLETE FEEDLOT INVENTORY
COMPLETE TECHNICAL STUDIES OF PESTICIDE APPLICATIONS
COMPLETE SALINITY PROBLEM INVENTORY
INITIATE SALINITY PROGRAM
INITIATE SEDIMENT PROGRAM
INITIATE NUTRIENT PROGRAM
COMPLETE OF PERSIS PESTICI
INTERSTATE STANDARDS FOR 21 STATES
APPROVED W.Q. STANDARDS FOR ALL STATES
FEDERAL REGULATIONS APPROVED
WQS FOR PESTICIDE ENFORCEMENT
EARLY PLANNING WITH SCREENING MODELS
COMPLETE STAGE 1 PLANNING
R&D ON FEEDLOTS
COMPLETE R&D AND IDENTIFY HAZARDOUS POLLUTANTS
PESTICIDES REPORT & CRITERIA
BASIN CONTROL TECHNOLOGY AVAILABLE
ANALYSIS OF EFFECT OF FEDERAL PROGRAMS
CONTROL OF PESTICIDE RUN-OFF FOR FEDERAL ACTIVITIES
CONTINUING CONTROL

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GRICULTURE MUM PROGRAM

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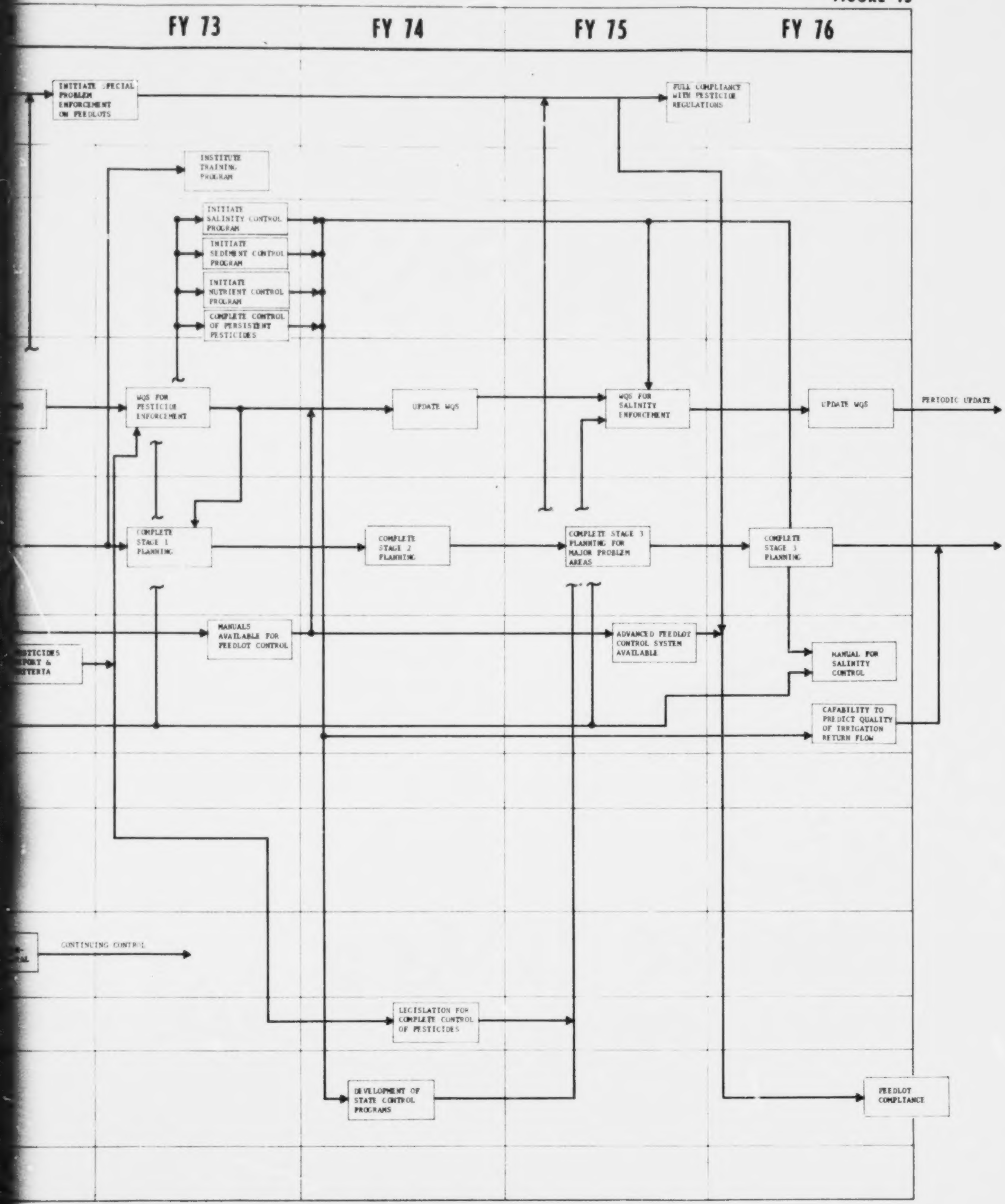
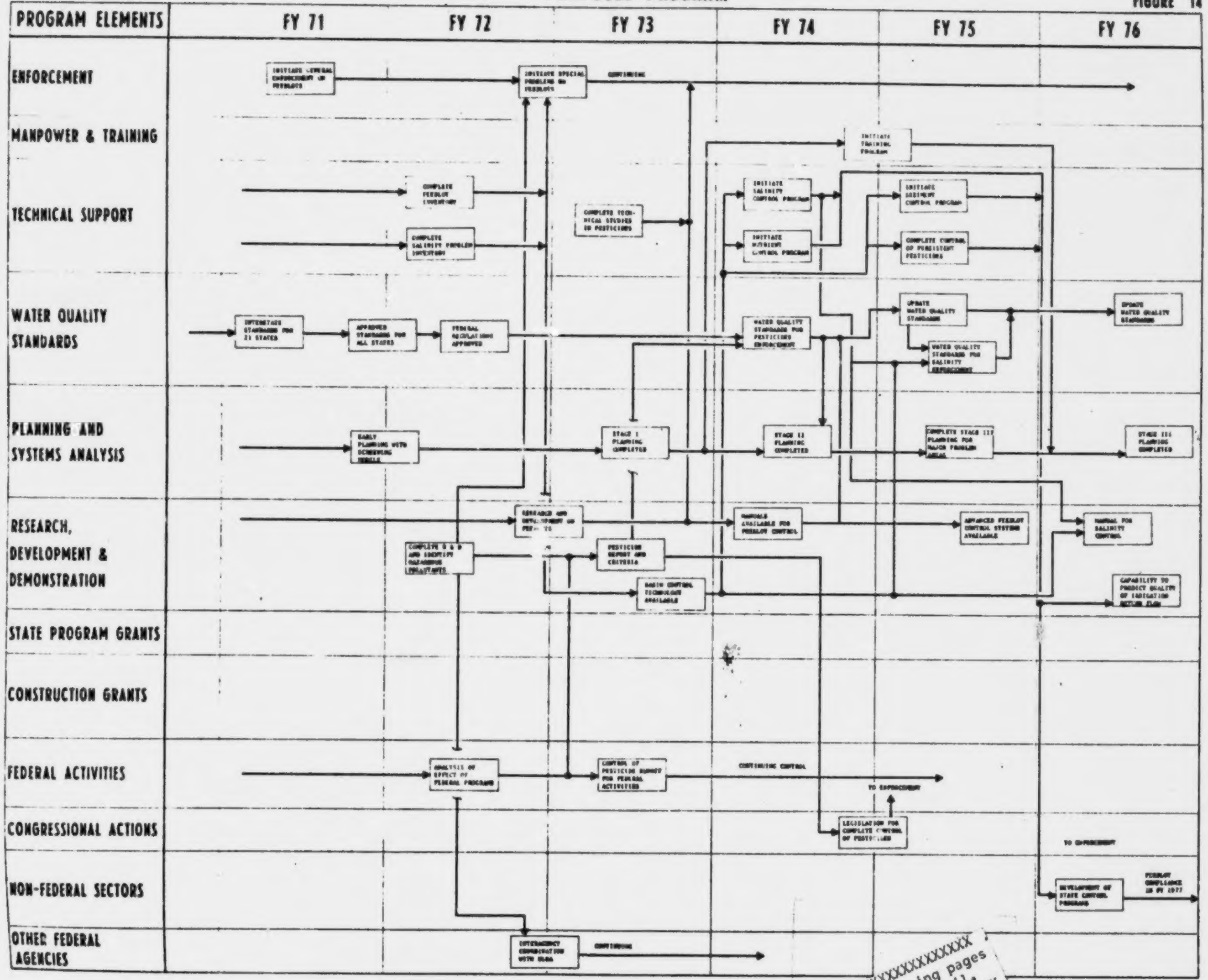
FIGURE 13


FY 73
FY 74
FY 75
FY 76
INITIATE SPECIAL PROBLEM ENFORCEMENT ON FEEDLOTS
FULL COMPLIANCE WITH PESTICIDE REGULATIONS
INSTITUTE TRAINING PROGRAM
INITIATE SALINITY CONTROL PROGRAM
INITIATE SEDIMENT CONTROL PROGRAM
INITIATE NUTRIENT CONTROL PROGRAM
COMPLETE CONTROL OF PERSISTENT PESTICIDES
WQS FOR PESTICIDE ENFORCEMENT
UPDATE WQS
WQS FOR SALINITY ENFORCEMENT
UPDATE WQS
PERIODIC UPDATE
COMPLETE STAGE 1 PLANNING
COMPLETE STAGE 2 PLANNING
COMPLETE STAGE 3 PLANNING FOR MAJOR PROBLEM AREAS
COMPLETE STAGE 3 PLANNING
MANUALS AVAILABLE FOR FEEDLOT CONTROL
ADVANCED FEEDLOT CONTROL SYSTEM AVAILABLE
STICIDES PORT & STERIA
MANUAL FOR SALINITY CONTROL
CAPABILITY TO PREDICT QUALITY OF IRRIGATION RETURN FLOW
CONTINUING CONTROL
LEGISLATION FOR COMPLETE CONTROL OF PESTICIDES
DEVELOPMENT OF STATE CONTROL PROGRAMS
FEEDLOT COMPLIANCE

AGRICULTURE WASTE
PROPOSED PROGRAM

FIGURE 14


PROGRAM ELEMENTS
FY 71
FY 72
FY 73
FY 74
FY 75
FY 76
ENFORCEMENT
MANPOWER & TRAINING
TECHNICAL SUPPORT
WATER QUALITY STANDARDS
PLANNING AND SYSTEMS ANALYSIS
RESEARCH, DEVELOPMENT & DEMONSTRATION
STATE PROGRAM GRANTS
CONSTRUCTION GRANTS
FEDERAL ACTIVITIES
CONGRESSIONAL ACTIONS
NON-FEDERAL SECTORS
OTHER FEDERAL AGENCIES
INITIATE GENERAL ENFORCEMENT ON FEEDLOTS
INITIATE SPECIAL PROBLEMS ON FEEDLOTS
CONTINUING
INITIATE TRAINING PROGRAM
COMPLETE FEEDLOT INVENTORY
COMPLETE SALINITY PROBLEM INVENTORY
COMPLETE TECHNICAL STUDIES ON PESTICIDES
INITIATE SALINITY CONTROL PROGRAM
INITIATE NUTRIENT CONTROL PROGRAM
INITIATE SEDIMENT CONTROL PROGRAM
COMPLETE CONTROL OF PERSISTENT PESTICIDES
INTERSTATE STANDARDS FOR 21 STATES
APPROVED STANDARDS FOR ALL STATES
FEDERAL REGULATIONS APPROVED
WATER QUALITY STANDARDS FOR PESTICIDES ENFORCEMENT
UPDATE WATER QUALITY STANDARDS
WATER QUALITY STANDARDS FOR SALINITY ENFORCEMENT
UPDATE WATER QUALITY STANDARDS
EARLY PLANNING WITH SCREENING MODELS
STAGE I PLANNING COMPLETED
STAGE II PLANNING COMPLETED
COMPLETE STAGE III PLANNING FOR MAJOR PROBLEM AREAS
STAGE III PLANNING COMPLETED
RESEARCH AND DEVELOPMENT ON FEEDLOTS
COMPLETE R & D AND IDENTIFY HAZARDOUS POLLUTANTS
PESTICIDE REPORT AND CRITERIA
BASIC CONTROL TECHNOLOGY AVAILABLE
MANUALS AVAILABLE FOR FEEDLOT CONTROL
ADVANCED FEEDLOT CONTROL SYSTEMS AVAILABLE
MANUAL FOR SALINITY CONTROL
CAPABILITY TO PREDICT QUALITY OF IRRIGATION RETURN FLOW
ANALYSIS OF EFFECT OF FEDERAL PROGRAMS
CONTROL OF PESTICIDE RUNOFF FOR FEDERAL ACTIVITIES
CONTINUING CONTROL
TO ENFORCEMENT
LEGISLATION FOR COMPLETE CONTROL OF PESTICIDES
TO ENFORCEMENT
DEVELOPMENT OF STATE CONTROL PROGRAMS
FEEDLOT COMPLIANCE IN FY 1977
INTERAGENCY COORDINATION WITH USDA
CONTINUING

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See the following pages
for greater detail.
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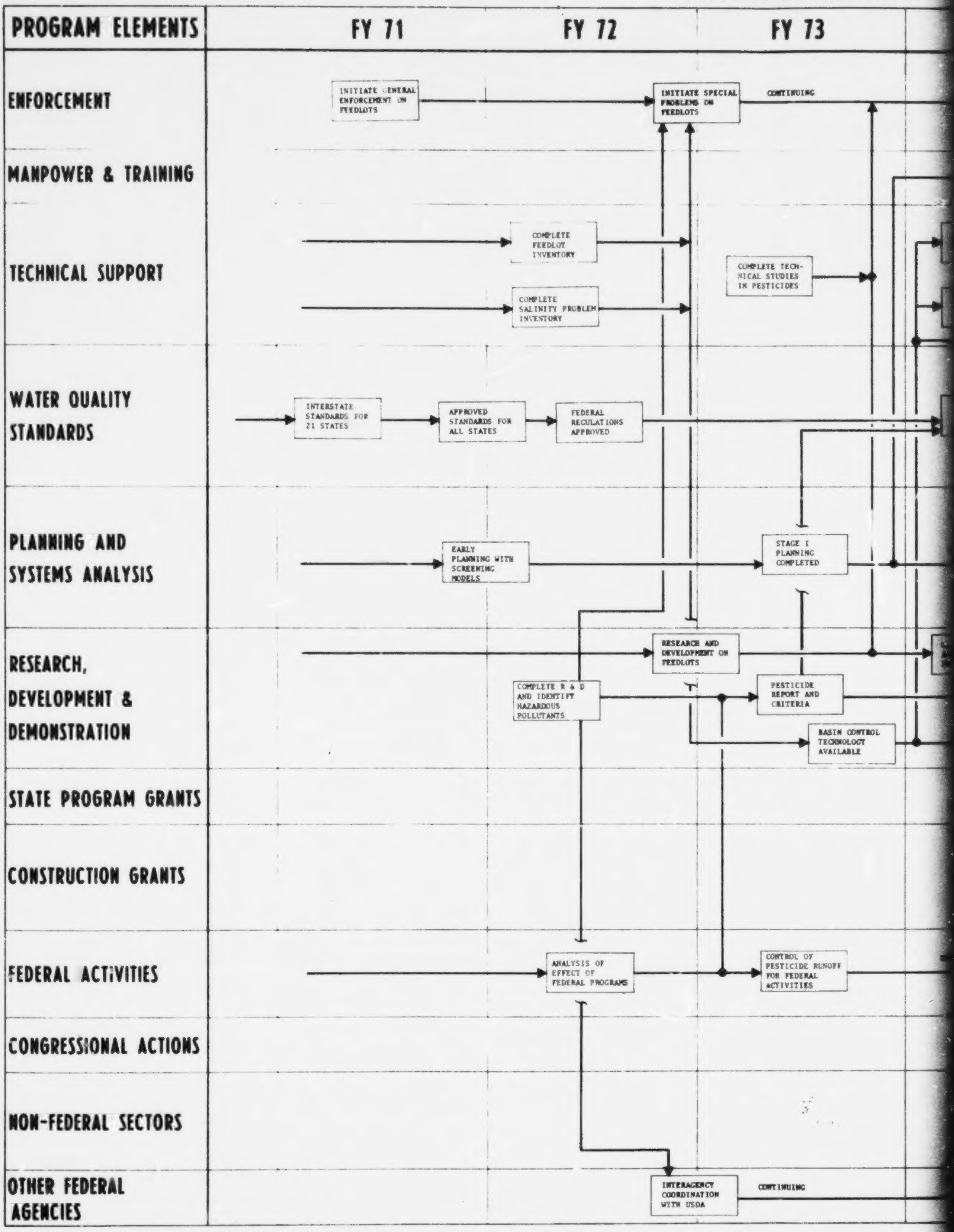
AGRICULTURE WASTE
PROPOSED PROGRAM


PROGRAM ELEMENTS
FY 71
FY 72
FY 73
ENFORCEMENT
MANPOWER & TRAINING
TECHNICAL SUPPORT
WATER QUALITY STANDARDS
PLANNING AND SYSTEMS ANALYSIS
RESEARCH, DEVELOPMENT & DEMONSTRATION
STATE PROGRAM GRANTS
CONSTRUCTION GRANTS
FEDERAL ACTIVITIES
CONGRESSIONAL ACTIONS
NON-FEDERAL SECTORS
OTHER FEDERAL AGENCIES
INITIATE GENERAL ENFORCEMENT ON FEEDLOTS
INITIATE SPECIAL PROBLEMS ON FEEDLOTS
CONTINUING
COMPLETE FEEDLOT INVENTORY
COMPLETE SALINITY PROBLEM INVENTORY
COMPLETE TECHNICAL STUDIES IN PESTICIDES
INTERSTATE STANDARDS FOR 21 STATES
APPROVED STANDARDS FOR ALL STATES
FEDERAL REGULATIONS APPROVED
EARLY PLANNING WITH SCREENING MODELS
STAGE I PLANNING COMPLETED
RESEARCH AND DEVELOPMENT ON FEEDLOTS
COMPLETE R & D AND IDENTIFY HAZARDOUS POLLUTANTS
PESTICIDE REPORT AND CRITERIA
BASIN CONTROL TECHNOLOGY AVAILABLE
ANALYSIS OF EFFECT OF FEDERAL PROGRAMS
CONTROL OF PESTICIDE RUNOFF FOR FEDERAL ACTIVITIES
INTERAGENCY COORDINATION WITH USDA
CONTINUING

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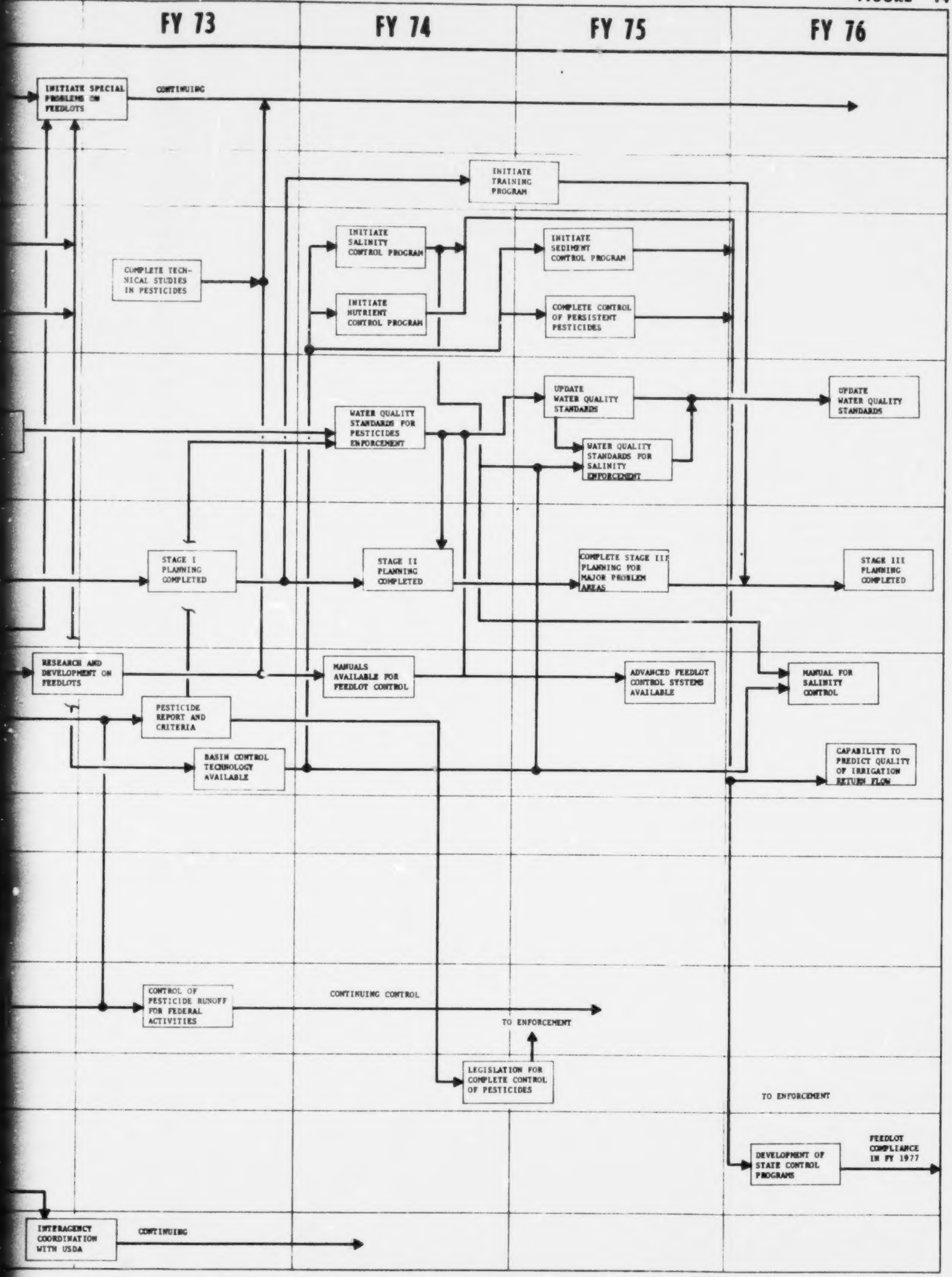
AGRICULTURE WASTE PROPOSED PROGRAM

B

FIGURE 14


FY 73
FY 74
FY 75
FY 76
INITIATE SPECIAL PROBLEMS ON FEEDLOTS
CONTINUING
INITIATE TRAINING PROGRAM
INITIATE SALINITY CONTROL PROGRAM
INITIATE SEDIMENT CONTROL PROGRAM
COMPLETE TECHNICAL STUDIES IN PESTICIDES
INITIATE NUTRIENT CONTROL PROGRAM
COMPLETE CONTROL OF PERSISTENT PESTICIDES
UPDATE WATER QUALITY STANDARDS
UPDATE WATER QUALITY STANDARDS
WATER QUALITY STANDARDS FOR PESTICIDES ENFORCEMENT
WATER QUALITY STANDARDS FOR SALINITY ENFORCEMENT
STAGE I PLANNING COMPLETED
STAGE II PLANNING COMPLETED
COMPLETE STAGE III PLANNING FOR MAJOR PROBLEM AREAS
STAGE III PLANNING COMPLETED
RESEARCH AND DEVELOPMENT ON FEEDLOTS
MANUALS AVAILABLE FOR FEEDLOT CONTROL
ADVANCED FEEDLOT CONTROL SYSTEMS AVAILABLE
MANUAL FOR SALINITY CONTROL
PESTICIDE REPORT AND CRITERIA
BASIN CONTROL TECHNOLOGY AVAILABLE
CAPABILITY TO PREDICT QUALITY OF IRRIGATION RETURN FLOW
CONTROL OF PESTICIDE RUNOFF FOR FEDERAL ACTIVITIES
CONTINUING CONTROL
TO ENFORCEMENT
LEGISLATION FOR COMPLETE CONTROL OF PESTICIDES
TO ENFORCEMENT
DEVELOPMENT OF STATE CONTROL PROGRAMS
FEEDLOT COMPLIANCE IN FY 1977
INTERAGENCY COORDINATION WITH USDA
CONTINUING

4.4 OTHER URBAN WASTES

4.4.1 SUMMARY OF PROBLEM AND STRATEGY FOR ITS SOLUTION

In addition to sewered municipal wastes, other urban wastes--including combined sewer discharges, other urban runoff, and unsewered municipal wastes--are a serious source of water pollution which must be attacked in the next five years in order to achieve water quality standards, even in part, by 1976. In large metropolitan regions where water-based recreational demand is expecially high and combined sewer systems are the rule instead of the exception, control of "other urban wastes" will be the keystone in meeting water quality standards and preventing closure of beaches during wet weather flows. Urban runoff wastes have many of the same adverse effects on water quality and water use as municipal sewage: they contain high concentrations of bacteria, solids, organics, and inorganics and result in attendant degradation of water quality. Separate and distinct from urban runoff, unsewered municipal wastes--primarily septic tanks--pollute surface and ground water where uncontrolled urban expansion has occurred. Recreational lakes (for example, Lake Tahoe) and drinking water supplies have been damaged by bacteria and nutrients from these sources.

The major objectives of the program to solve the other urban waste problem are: (1) to control 50 percent of combined storm/sanitation sewer overflows by 1976 by controlling the problems in 25 major cities; and (2) to complete, by 1974, the development of an effective onsite disposal system for use in individual homes and small communities.

To accomplish these goals, three major program elements of FWQA must complete a number of interrelated activities. (1) Basin planning must identify the most cost-effective investments to be made in other urban controls. (2) Research must provide an array of technical alternatives for controlling other urban wastes because conventional measures are not directly applicable to control these waste sources. (3) A construction assistance program may be required to provide local government with about 50 percent of the financing cost of control measures.

Because of their variable nature and variable quality, other urban wastes cannot be treated by conventional waste treatment measures. FWQA research has already devised some new techniques for control of these wastes. The need remains, however, to define more accurately the full scale costs and applications of each, to

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determine potentials for cost reduction, and to effect a technology transfer to local communities. This effort must be accelerated over the next three years so that construction program can benefit from cost-effective technology.

The key element in meeting program goals is the initiation of a construction grants program, starting in FY 1973, to assist local communities in building control devices for urban runoff wastes.

Basin planning plays a key role in identifying the most serious problems relative to urban runoff wastes and providing plans for their solution. As proposed, combined sewer overflows and storm water discharges would be included in basin planning milestones as listed in Section 3 of this document.

4.4.2 ANTICIPATED ACHIEVEMENTS FOR PROPOSED PROGRAM

Fiscal Year 1972

- Develop legislative program for providing financial assistance to remedial works.

Fiscal Year 1973 - 1976

- Have demonstrated techniques and methods for controlling urban runoff.
- Achieve 100 percent control of these types of wastes from all Federal installations.
- Achieve 50 percent control of urban runoff.

4.4.3. SUMMARY OF PROGRAMS

Differences in the levels of accomplishment for the optimum and proposed programs are shown in Table 12.

Major milestones and interrelationships for the two programs are the same, as shown in Figure 15.

TABLE 12

OTHER URBAN WASTE ACTIVITIES AND IMPACT

ACTIVITY	OPTIMUM PROGRAM	PROPOSED PROGRAM	IMPACT
Research, Development & Demonstration			
Storage Technology	Determine storage configuration which can be applied to the problem, to demonstrate the use and evaluate the control effectiveness and associated costs.	No change	None
Physical Treatment	Upgrade the flow-rate capability of physical treatment methods considered thus permitting their use in treating storm-generated flows.	No change	None
Planning & Engineering Methodology	Transfer already developed modeling technology and refine the model to apply to entire metropolitan areas and to define and improve its sensitivity to data inputs. Demonstrate the model as a tool for developing metropolitan control systems. Improve the model as a design and decisionmaking tool.	Task deferred for one year with loss of $ .566 million	Modeling capability will not be available until construction program is underway. Construction proceeding will therefore be less cost-effective
Biological Treatment	Adopt conventional biological methods to permit their use in a new functional manner.	No change	None
In System Control	Modify the existing systems to maximize the storage capacity to reduce the frequency of overflows.	Task cut 1/3 in FY 1971	Reduction will slide completion of task about 6 months into the future
Physical-Chemical Treatment	Improve the physical treatment methods by adding chemical processes to increase treatment rate capability.	Deferred one year. Full funding FY 1972-1976	Little impact is expected by this cutback. The slippage will result in more experience with conventional physical chemical treatment
Construction Material & Practices	Improve performance capabilities and reduce facility, and operation and maintenance costs. Reduce labor costs through materials improvements and better construction methods.	No change	None
Storm Water Application	Adopt control and treatment methods developed and demonstrated for combined sewer overflow problems to storm water discharges.	No change	None
Nonsewered Urban Runoff Application	Adopt control and treatment methods developed and demonstrated for combined sewer overflow problems to nonsewered urban runoff.	No change	None
Onsite Disposal Systems	Complete development of effective onsite disposal systems for individual homes and small communities.	Level of effort in FY 1971 reduced by 1.7	More load must be picked up by industry. $1/2 million is adequate for demonstration of priority systems in FY 1971
Transfer Technology	Transfer disposal technology through information to health department sanitarians and local authorities so that local ordinances can require such devices be installed.	No change	None

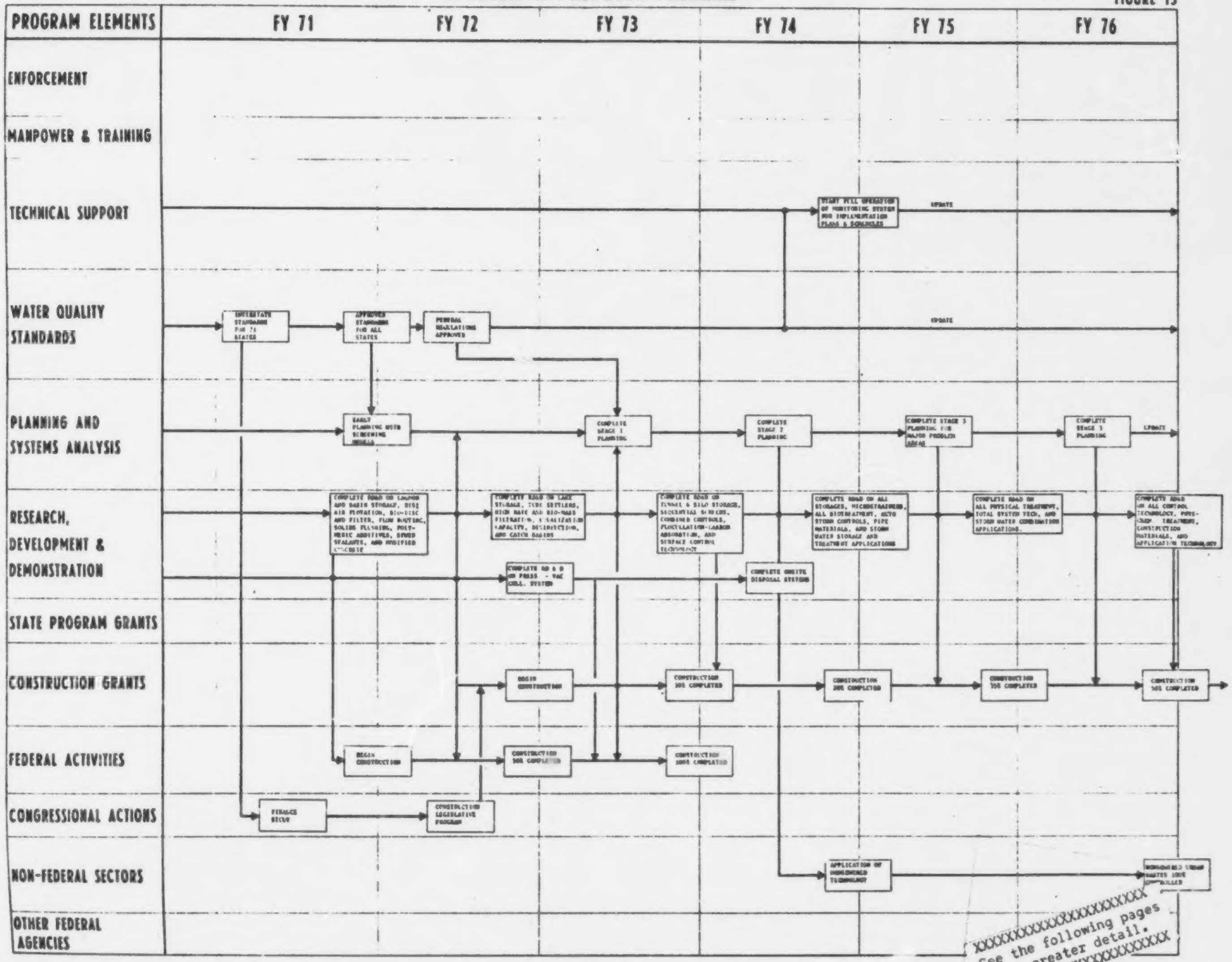
TABLE 12 (continued)

OTHER URBAN WASTE
ACTIVITIES AND IMPACT

ACTIVITY	OPTIMUM PROGRAM	PROPOSED PROGRAM	IMPACT
Construction Grants			
Urban Runoff Grants	Obtain the optimum goal of 50% control of combined sewer overflows and storm water discharges in about 25 major cities which will require a Federal investment of $6.25 billion to complete $12.5 billion of total construction. The program will start in FY 1973 at $500 million ($250 million Federal and $250 million State and local) and be phased upward in later years.	No change	None
Administration of Grants	Administer the urban runoff grants through the construction grants program. Summary manpower and administrative costs are included in the summary table.	No change	None
Basin Planning			
Urban Runoff Planning	Identify the priority areas into which grant assistance for combined sewer overflows should be channeled. Provide plans for such control.	No change	None

OTHER URBAN WASTE
OPTIMUM & PROPOSED PROGRAM

FIGURE 15


PROGRAM ELEMENTS
FY 71
FY 72
FY 73
FY 74
FY 75
FY 76
ENFORCEMENT
MANPOWER & TRAINING
TECHNICAL SUPPORT
WATER QUALITY STANDARDS
PLANNING AND SYSTEMS ANALYSIS
RESEARCH, DEVELOPMENT & DEMONSTRATION
STATE PROGRAM GRANTS
CONSTRUCTION GRANTS
FEDERAL ACTIVITIES
CONGRESSIONAL ACTIONS
NON-FEDERAL SECTORS
OTHER FEDERAL AGENCIES
START FULL OPERATION OF MONITORING SYSTEM FOR IMPLEMENTATION PLANS & SCHEDULES
UPDATE
INTERSTATE STANDARDS FOR 74 STATES
APPROVED STANDARDS FOR ALL STATES
FEDERAL REGULATIONS APPROVED
UPDATE
EARLY PLANNING WITH SCREENING MODELS
COMPLETE STAGE 1 PLANNING
COMPLETE STAGE 2 PLANNING
COMPLETE STAGE 3 PLANNING FOR MAJOR PROBLEM AREAS
COMPLETE STAGE 3 PLANNING
UPDATE
COMPLETE RD&D ON LAGOON AND BASIN STORAGE, DISC AIR FLOTATION, BIO-DISC AND FILTER, FLOW ROUTING, SOLIDS FLUSHING, POLYMERIC ADDITIVES, SEWER SEALANTS, AND MODIFIED CONCRETE
COMPLETE RD&D ON LAKE STORAGE, TUBE SETTLERS, HIGH RATE AND BIO-MASS FILTRATION, EQUALIZATION CAPACITY, DISINFECTION, AND CATCH BASINS
COMPLETE RD&D ON TUNNEL & SILO STORAGE, SEQUENTIAL SCREENS, COMBINED CONTROLS, FLOCCULATION-CARBON ABSORPTION, AND SURFACE CONTROL TECHNOLOGY
COMPLETE RD&D ON ALL STORAGES, MICROSTRAINERS, ALL BIOTREATMENT, AUTO STORM CONTROLS, PIPE MATERIALS, AND STORM WATER STORAGE AND TREATMENT APPLICATIONS
COMPLETE RD&D ON ALL PHYSICAL TREATMENT, TOTAL SYSTEM TECH, AND STORM WATER COMBINATION APPLICATIONS.
COMPLETE RD&D ON ALL CONTROL TECHNOLOGY, PHYS-CHEM TREATMENT, CONSTRUCTION MATERIALS, AND APPLICATION TECHNOLOGY
COMPLETE RD & D ON PRESS - VAC COLL. SYSTEM
COMPLETE ONSITE DISPOSAL SYSTEMS
BEGIN CONSTRUCTION
CONSTRUCTION 10% COMPLETED
CONSTRUCTION 30% COMPLETED
CONSTRUCTION 30% COMPLETED
CONSTRUCTION 50% COMPLETED
BEGIN CONSTRUCTION
CONSTRUCTION 50% COMPLETED
CONSTRUCTION 100% COMPLETED
FINANCE STUDY
CONSTRUCTION LEGISLATIVE PROGRAM
APPLICATION OF IMPROVED TECHNOLOGY
NONFEDERAL URBAN WASTES 100% CONTROLLED

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for greater detail.
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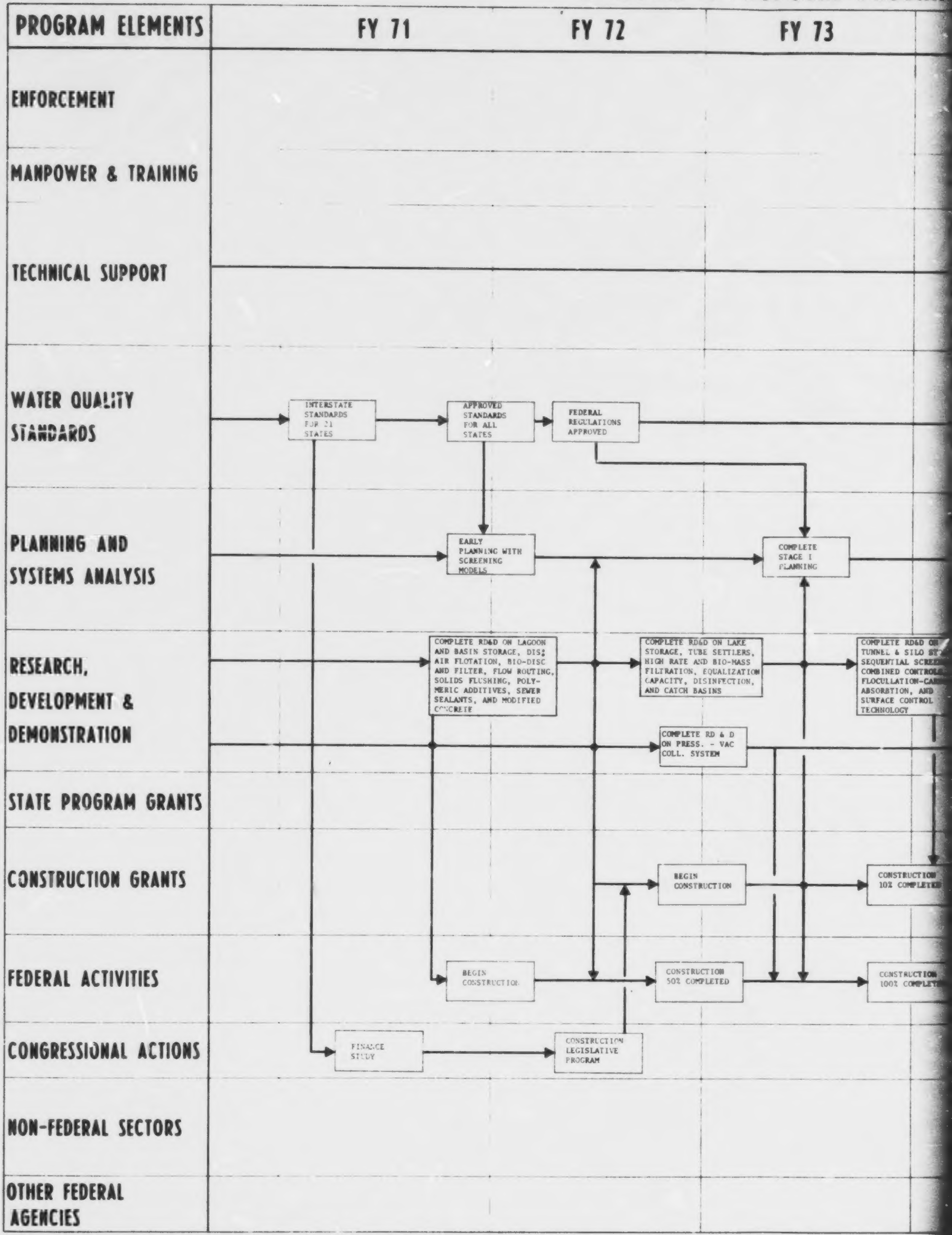
OTHER URBAN WASTE
OPTIMUM & PROPOSED PROGRA


PROGRAM ELEMENTS
FY 71
FY 72
FY 73
ENFORCEMENT
MANPOWER & TRAINING
TECHNICAL SUPPORT
WATER QUALITY STANDARDS
PLANNING AND SYSTEMS ANALYSIS
RESEARCH, DEVELOPMENT & DEMONSTRATION
STATE PROGRAM GRANTS
CONSTRUCTION GRANTS
FEDERAL ACTIVITIES
CONGRESSIONAL ACTIONS
NON-FEDERAL SECTORS
OTHER FEDERAL AGENCIES
INTERSTATE STANDARDS FOR 21 STATES
APPROVED STANDARDS FOR ALL STATES
FEDERAL REGULATIONS APPROVED
EARLY PLANNING WITH SCREENING MODELS
COMPLETE STAGE I PLANNING
COMPLETE RD&D ON LAGOON AND BASIN STORAGE, DIS; AIR FLOTATION, BIO-DISC AND FILTER, FLOW ROUTING, SOLIDS FLUSHING, POLYMERIC ADDITIVES, SEWER SEALANTS, AND MODIFIED CONCRETE
COMPLETE RD&D ON LAKE STORAGE, TUBE SETTLERS, HIGH RATE AND BIO-MASS FILTRATION, EQUALIZATION CAPACITY, DISINFECTION, AND CATCH BASINS
COMPLETE RD&D ON TUNNEL & SILO ST SEQUENTIAL SCREE COMBINED CONTROL FLOCULLATION-CA ABSORBTION, AND SURFACE CONTROL TECHNOLOGY
COMPLETE RD & D ON PRESS. - VAC COLL. SYSTEM
BEGIN CONSTRUCTION
CONSTRUCTION 10% COMPLETE
BEGIN CONSTRUCTION
CONSTRUCTION 50% COMPLETED
CONSTRUCTION 100% COMPLET
FINANCE STUDY
CONSTRUCTION LEGISLATIVE PROGRAM

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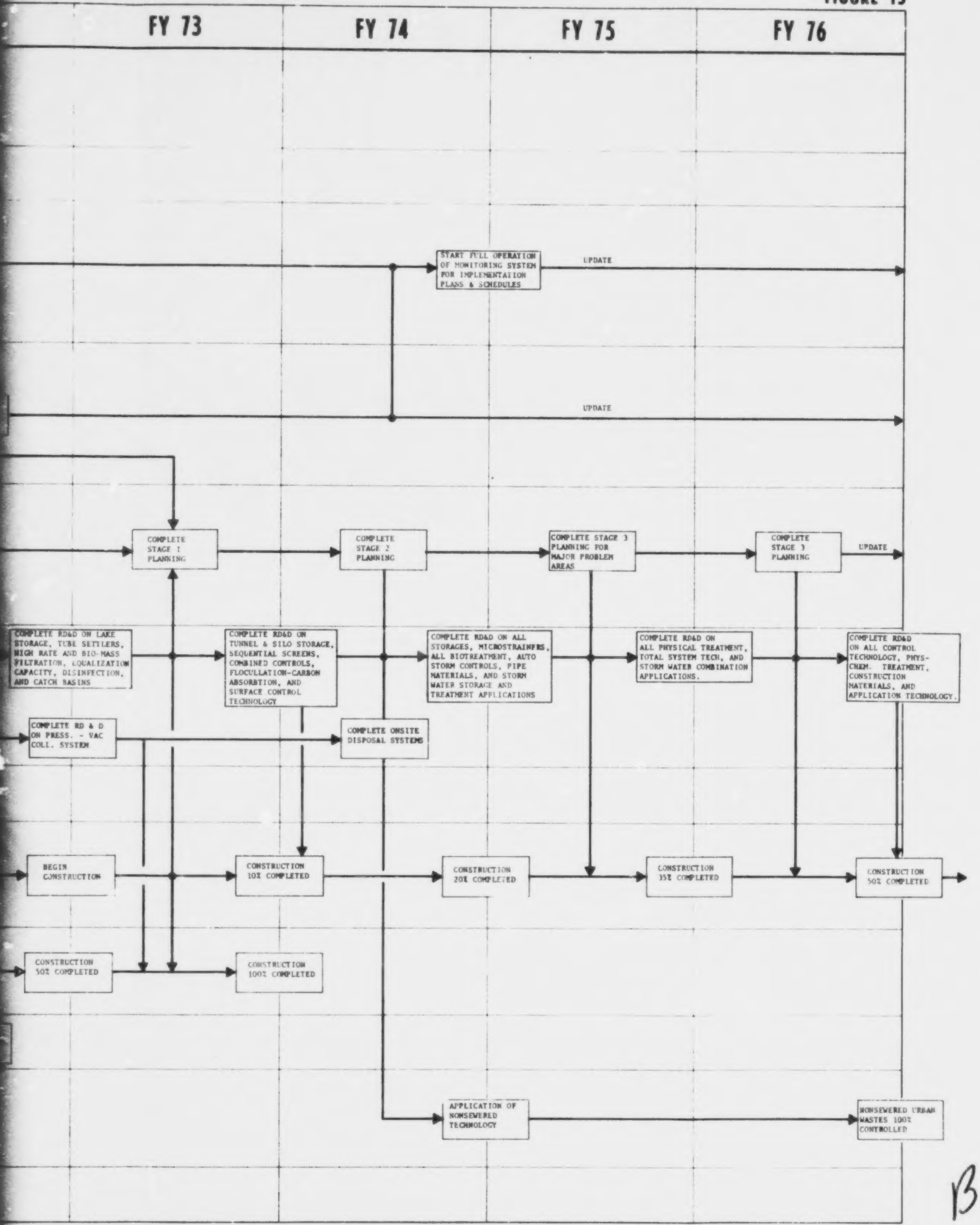
OTHER URBAN WASTE
NUM & PROPOSED PROGRAM

FIGURE 15


FY 73
FY 74
FY 75
FY 76
START FULL OPERATION OF MONITORING SYSTEM FOR IMPLEMENTATION PLANS & SCHEDULES
UPDATE
UPDATE
COMPLETE STAGE 1 PLANNING
COMPLETE STAGE 2 PLANNING
COMPLETE STAGE 3 PLANNING FOR MAJOR PROBLEM AREAS
COMPLETE STAGE 3 PLANNING
UPDATE
COMPLETE RD&D ON LAKE STORAGE, TUBE SETTLERS, HIGH RATE AND BIO-MASS FILTRATION, EQUALIZATION CAPACITY, DISINFECTION, AND CATCH BASINS
COMPLETE RD&D ON TUNNEL & SILO STORAGE, SEQUENTIAL SCREENS, COMBINED CONTROLS, FLOCULLATION-CARBON ABSORBTION, AND SURFACE CONTROL TECHNOLOGY
COMPLETE RD&D ON ALL STORAGES, MICROSTRAINERS, ALL BIOTREATMENT, AUTO STORM CONTROLS, PIPE MATERIALS, AND STORM WATER STORAGE AND TREATMENT APPLICATIONS
COMPLETE RD&D ON ALL PHYSICAL TREATMENT, TOTAL SYSTEM TECH, AND STORM WATER COMBINATION APPLICATIONS.
COMPLETE RD&D ON ALL CONTROL TECHNOLOGY, PHYS-CHEM. TREATMENT, CONSTRUCTION MATERIALS, AND APPLICATION TECHNOLOGY.
COMPLETE RD & D ON PRESS. - VAC COLL. SYSTEM
COMPLETE ONSITE DISPOSAL SYSTEMS
BEGIN CONSTRUCTION
CONSTRUCTION 10% COMPLETED
CONSTRUCTION 20% COMPLETED
CONSTRUCTION 35% COMPLETED
CONSTRUCTION 50% COMPLETED
CONSTRUCTION 50% COMPLETED
CONSTRUCTION 100% COMPLETED
APPLICATION OF NONSEWERED TECHNOLOGY
NONSEWERED URBAN WASTES 100% CONTROLLED

B

4.5 OIL AND HAZARDOUS MATERIALS SPILLS

4.5.1 SUMMARY OF PROBLEM AREA AND STRATEGY FOR ITS SOLUTION

Presently, an estimated 10,000 spills of oil and hazardous materials occur annually in the navigable waters of the Nation. Oil spills are expected to triple over the next 30 years as a result of increased transport, storage, and transfer. The production of hazardous materials is expected to increase by 73 percent in the next ten years. "Spills" are distinguished as noncontinuous discharges of dumping which usually occur as a result of accidents, malfunctions of equipment, or human error. They also include discharges of oily ballast water, discharges from tank cleaning operations, convenience dumping of hazardous materials into sewers or the environment, and waste oil from crankcases and industrial uses.

Damages caused by oil pollution are both significant and diverse. Such pollution can destroy or limit marine life, ruin wildlife habitat, kill birds, limit or destroy the recreational value of beach areas, contaminate water supplies and create fire hazards. Damages caused by other hazardous substances can be just as significant and diverse as those caused by oil pollution. The sheer volume of oil transported or used, however, makes oil the largest single source of pollution of this type.

Methods to prevent spills are available. There is a substantial body of conventional, "good-common-sense" preventive technology and operating practices currently available which are not being fully used. The technology for containing, removing, disposing of, and cleaning up the damage from spills must be classed as primitive and requires a considerable research effort.

The Water Quality Improvement Act of 1970 provides a strong and comprehensive statutory authority under which to pursue Federal action to combat and prevent oil spills. The Act provides for (1) definition of illegal oil discharges; (2) regulations, penalties, liabilities, and enforcement actions to contain and clean up oil

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by the responsible party, (3) Federal action and a revolving fund to combat oil spills where the responsible party fails to act; and most importantly, (4) Federal regulations to secure the prevention of oil spills. Section 12 of the Act establishes authority to designate as hazardous substances those materials which when discharged may impair water quality. Additional legislation will be needed to establish liabilities and penalties and other appropriate measures to enable effective control of hazardous materials pollution.

Coordination with the Department of Transportation and other agencies for the participation in preparing regulations and reports and in planning will be necessary. Pursuant to the Act and the President's delegation of authority pertaining thereto, the Federal program for dealing with oil and hazardous materials spills is jointly carried out by the Department of Interior (FWQA), the Department of Transportation (Coast Guard), the Council on Environmental Quality, and the Federal Maritime Administration. (Other Federal agencies are involved through the National Contingency Plan.) The principal program elements are jointly conducted by FWQA and the Coast Guard and the lead responsibilities are allocated as follows:

(1) For establishing and enforcing regulations on oil spills and on Federal contingency planning response actions:

FWQA - Inland waters except the Great Lakes.

Coast Guard - Coastal and Great Lakes waters and harbors.

(2) For establishing and enforcing regulations on prevention of oil spills:

FWQA - Nontransportation-related onshore and offshore facilities.

Coast Guard - Vessels and transportation-related onshore and offshore facilities.

FWQA's program is coordinated with that of the Coast Guard and it is expected that the Coast Guard program will be integrated with and parallel to FWQA objectives, time-phased goals and program priorities. Subtasks are:

(1) To coordinate with Department of Transportation on President's report on hazardous materials - Fiscal Year 1971.

(2) To coordinate with Department of Transportation Financial Liability report due January 1, 1971.

(3) To coordinate regulations for oil spill prevention and removal.

(4) To coordinate regulations for hazardous substances on designation and removal.

(5) To coordinate with Department of Transportation and other agencies on spill response programs.

Effective spill prevention and response programs are almost nonexistent at the State and local levels. Such programs to complement the Federal effort will be essential for an effective national effort. At least five States have begun to move ahead with oil spill programs and others are expected to follow suit as the Federal Government begins to lead the way.

Regulations for regional and local contingency plans will be promulgated and these together with Federal assistance will provide the guidelines to promote the development of State and local programs. It is expected that within five years, the State and local programs will begin to relieve Federal program effort in preventing spills.

An important element of the Water Quality Improvement Act of 1970 is the imposition of financial responsibility and liability on the parties responsible for oil spills. No such incentives have existed before and their emergence should play a significant role in encouraging the industries to cooperate in reducing spills.

The program strategy for controlling oil and hazardous materials spills, in order to achieve compliance with water quality standards by 1976, has the following objectives:

(1) To establish and enforce effective regulations to control and clean up oil and hazardous materials spills by responsible parties.

(2) To provide a fully adequate Federal response to carry out the cleanup of spills where the responsible party fails to act.

(3) To implement a comprehensive prevention program that will eliminate, by the end of FY 1976, all preventable spills and attenuate those spills caused by acts-of-God and unavoidable accidents.

(4) To promote and assist State and local agencies in developing respective contingency plans, response capabilities and prevention programs so that they might eventually assume major responsibility in controlling oil and hazardous materials pollution.

(5) To provide a research and development program and advanced technology to carry out the above tasks.

To accomplish this strategy, the following tasks by program element are assigned:

Technical Support is responsible for the core elements. These are: to establish and revise regulations; to organize and maintain response teams and their capabilities; to develop and conduct a preventive program; and to coordinate with the Department of Transportation and other agencies in developing and implementing the National Contingency Plan (as a participant under the Council of Environmental Quality). Promotion of State programs and assistance to the States and local agencies in developing respective contingency plans, response capabilities, and prevention programs will also be undertaken.

Research, Development and Demonstration has the important task of advancing the present primitive technology for dealing with oil and hazardous materials spills and waste oil discharges. Data on fate and effects of oil and hazardous materials and on the agents used to cope with spill incidents is needed to revise the regulations. Spill response techniques are needed for countermeasures to mitigate damage caused by the spills. Disposal methods of material removal from a spill are important to avoid secondary pollution. Techniques must be developed to prevent spillage.

Enforcement will prepare evidence, assess penalities, and pursue legal actions against noncompliance with regulations and violations of the Refuse Act of 1899 and water quality standards.

Federal Activities coordination will ensure that Federal installations are keeping pace with the private sector in abating pollution. Manpower and Training will develop courses to train Federal and State personnel for spill response and prevention.

Training programs will be developed for Federal State personnel for spill response, prevention methods, techniques and inspection programs.

4.5.2 ANTICIPATED ACCOMPLISHMENTS FOR THE PROPOSED PROGRAM

Fiscal Year 1971

-Develop regulations for defining harmful quantities of oil; develop prevention and removal methods for oil; designate materials that are hazardous and describe removal methods; and establish local-regional contingency response plans.

-Revise Regional Contingency Plans.

-Coordinate with U.S. Coast Guard on regulations and reports on hazardous materials and liability.

-Provide technological data on fate and effect of dispersants, oil, and hazardous materials.

-Develop methods to identify source of oil slicks and standard test for dispersants.

-Complete cost study.

Fiscal Year 1972

-Conduct operative enforcement program.

-Revise regulations, designate hazardous materials, and revise contingency plans.

-Complete hazardous materials reliability study and develop waste oil reception and reuse systems.

-Enact legislation for hazardous materials.

-Have an operational Federal installation prevention program.

-Train Federal personnel in prevention and start courses for State personnel.

-Develop State contingency plans for key river basin plans.

-Hold national conference for hazardous materials.

-Coordinate revised regulations and coordinate with the Department of Transportation on civil and criminal penalties for discharge of oil and hazardous materials.

-Determine the fate and effect of oil and hazardous materials on key fish and wildlife species and movement in water.

- -Develop new techniques to control and remove spilled hazardous materials, to identify and monitor spilled materials, and methods to detect oil concentration in discharges.

- -Develop methods for converting recovered oil to useful products, develop separator for oily wastes, and methods to incinerate removed material.

- -Complete petroleum industry reliability study and study of process changes to prevent spillage.

- -Develop spill response system for all high-risk Federal installations.

- -Develop training program for spill response for Federal personnnel.

Fiscal Year 1973-1976

- -Continue revision of regulation and contingency plans.

- -Determine State and local spill response capabilities (FY 1973).

- -Develop State model regulations.

- -Develop operational prevention program (FY 1973).

- -Hold national oil conference (FY 1973).

- -Continue coordination.

- -Determine fate and effect of sunken oil and continued assessment of impact on environment of oil and hazardous materials.

- -Develop operational oil spill response system, oil tagging system, and evaluate countermeasures.

- -Develop technology for burial and landfill methods for disposal and reuse.

4.5.3 SUMMARY OF PROGRAMS

Major milestones and interrelationships for the optimum and proposed programs are shown in Figures 16 and 17 respectively.

Differences in the levels of accomplishment for the two programs are shown in Table 13.

TABLE 13

OIL AND HAZARDOUS
MATERIALS SPILLS

ACTIVITY	OPTIMUM PROGRAM	PROPOSED PROGRAM	IMPACT
Technical Support	Key Tasks: A program should be implemented to regulate, prevent, and respond to spills.		
Oil and Hazardous Material Regulations	Regulations required under P.L. 91-224, Sections 11 and 12 should be developed during FY 1971 to: define harmful quantities of oil, describe local-regional contingency response plans, describe prevention and removal methods for oil, and describe materials that are hazardous and removal methods. In FY 1972, these regulations will be revised as needed and the designation of hazardous materials will continue.	These tasks would be accomplished as scheduled, but data requirements would be obtained by contract rather than FWQA personnel. There would be more reliance on catching up by revisions in FY 1972.	This task is specified by law and is essential to accomplish the objectives. Cooperation and input from other agencies must be on schedule. Additional legislation is required for hazardous materials prevention regulations. Proposed reductions will reduce the quality of the regulations 20%.
Spill Response	A program should be implemented to promote adequate cleanup actions by dischargers of oil and hazardous materials and to promote State, local, and industry capability to respond to spills. This task must revise the National and Regional Contingency Plans by the end of FY 1971, develop State plans and plans on key river basins by the end of FY 1972, insure effective State and local response capabilities to cope with chronic and major spills by the end of 1973, and implement the results of research projects as they become available in FY 1972 and 1973.	The proposed program will operate at about 60% of the optimum. Work on State and local plans and plans for key basins will be reduced. Response in FY 1971 to small spills on inland waters would be limited.	Operating at less than optimum will prohibit meaningful response to the small chronic spills which will continue to have adverse effects on the aquatic environment. There would be a reduction of 10-15% in meeting the water quality goal.
Prevention	A prevention program must be provided that will be directed toward reducing the occurrence and impact of spills thereby relieving the need to maintain a high level of spill response capabilities. Field surveys and facilities inventories must be conducted to identify design specifications, equipment characteristics, preventative measures and operational procedures to prevent spills by the end of FY 1972. Facilities will be inspected to assure compliance with prescribed methods and procedures from FY 1972 and on. Criteria for certification of facilities during FY 1972, public education programs and the States model regulations starting in FY 1973 will be developed.	The proposed program will shift the optimum one year. During FY 1971, there will be only follow-up on spill incidents to determine the cause and means to prevent further discharge.	Reduction in optimum program would have significant adverse effects on the spill response and enforcement tasks. Legislation is required for a hazardous material prevention program. Accomplishment of the optimum task would result in an 80% reduction of spill incidents. The proposed shift will reduce this from 80% to 65% and more importantly, for FY 1971 there would be one more year of discharge of toxic materials into the aquatic environment.
Coordination	P.L. 91-224 and E.O. 11548 have created new multiagency programs relative to regulation preparation, report preparation, planning and spill response. The critical program that must be accomplished is the coordination with DOT on: the President's report on hazardous materials due May 1970; the Financial Liability report for January 1971; regulations for designation and removal of hazardous materials during FY 1971.	For FY 1971 the proposed program is 10% of the optimum.	There must be an aggressive coordinated effort on studies, reports, regulation and response with DOT to meet such milestones as the report to the President on hazardous materials liabilities which is due November 1970, and the meeting of water quality goals in both inland and coastal zones. The

TABLE 13 (continued)

OIL AND HAZARDOUS
MATERIALS SPILLS

ACTIVITY	OPTIMUM PROGRAM	PROPOSED PROGRAM	IMPACT
			reduction proposed will result in a less aggressive effort in coordination and will increase the risk of errors and time for review.
Research and Development	Key Tasks: A program should be provided to improve the current primitive technology for dealing with oil and hazardous materials spills and waste oil discharges.		
Fate and effect of oil and hazardous materials and of agents used to cope with spill incidents	Controlled laboratory studies, and studies conducted at a field test facility are needed to provide for reliable data concerning: (1) the potential effects of spillage and the measures taken to cope with the spillage on all beneficial water uses; and (2) the movement and changes in physical and chemical properties of the spilled material in response to environmental forces at the site of the spill. Determine the environmental effects of oil and hazardous materials on key fish and wildlife species in FY 1971-1972, and continue effects studies on other water uses from FY 1973 to 1976. Determine the environmental effects of cleanup techniques particularly dispersants, during FY 1971; the fate and movement of oil and hazardous materials in water by FY 1973 and on ice during FY 1971; and the fate and effects of sunken oil by FY 1974.	The proposed program will operate at 60% of the optimum in FY 1971 eliminating any efforts to begin research on this fate and movement of oil on ice and reducing the efforts in the other areas.	The task is essential to provide technical data for effective enforcement and response programs by others. Reductions in this area would be a limiting factor to successful court action and to significant revision of the regulations.
Spill responses	Techniques should be developed to lessen damage caused by spilled oil and hazardous material along with countermeasures to protect public health and the water ecosystem. Identification and monitoring procedures should be carried out to determine: the source of oil slicks in FY 1971; the presence of spilled materials on surface waters (FY 1971); new methods to identify spills and measure oil concentrations in discharges (FY 1972); and a complete oil tagging system (FY 1973). Countermeasures should be developed to include a standard test for dispersant effectiveness in FY 1971, a state-of-the-art study on controls in FY 1971, and an operational oil spill response system by the end of FY 1973. Restoration measures should also be developed to overcome the effects of hazardous materials during FY 1972.	The proposed program will operate at 55% of the optimum. Tasks on identification and monitoring and the state-of-the-art study on hazardous materials will be carried out.	Techniques on control and removal of spilled materials must be accomplished to provide the necessary technology to carry out the response, enforcement, and FAC tasks. The reductions will not delay the critical tasks in the proposed program but will set back other efforts in developing technology for disposal of removed materials.
Disposal of oil and hazardous materials removed from spill sites.	Countermeasures to control or mitigate damages from spilled oil and hazardous materials will result in the need for technology to dispose of the spilled materials in a manner to preclude subsequent damage to the environment.	The proposed program will operate at 66% in FY 1971. The state-of-the-art study will be carried out at a reduced effort.	Improper disposal may lead to problems of secondary levels of pollution. Delays in accomplishing the elements during the period FY 1972-1974 will

TABLE 13 (continued)

OIL AND HAZARDOUS
MATERIALS SPILLS

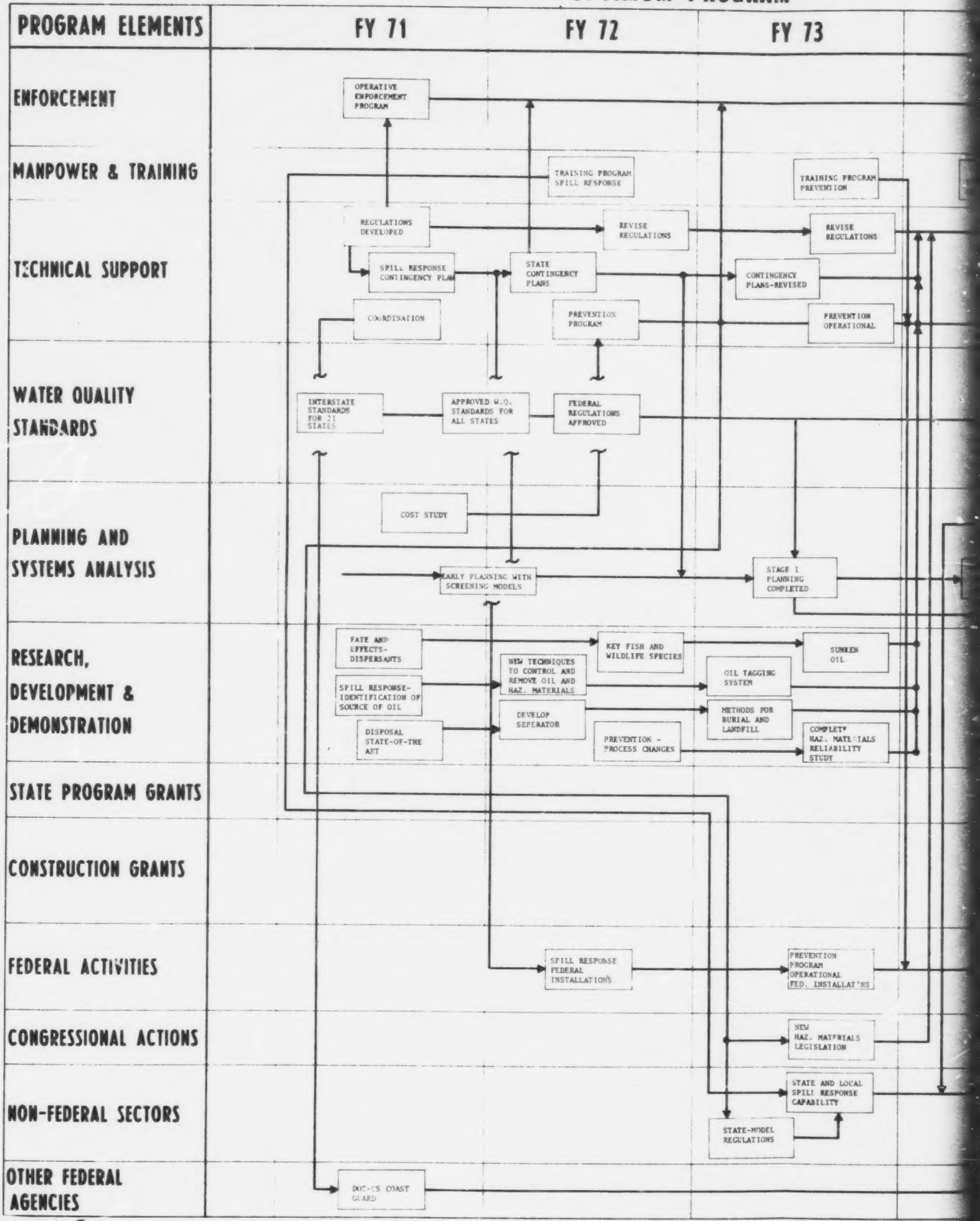
ACTIVITY	OPTIMUM PROGRAM	PROPOSED PROGRAM	IMPACT
	A state-of-the-art study will be accomplished in FY 1971. Methods of ultimate disposal for spilled hazardous materials will be developed in FY 1971 and demonstrated at field sites by FY 1973. Methods will be developed for the conversion of recovered oil to useful products during FY 1972 and for the conversion of hazardous materials in FY 1973. An improved separator will be developed to removed oily wastes from waste water during FY 1972. In addition, techniques will be developed for the incineration of removed hazardous materials in FY 1972, for burial and landfill by FY 1973 and for biostabilization and encapsulation before FY 1974.		prevent proper responses. The reduced effort will lessen the quality of the study in FY 1971 by 25% but will provide enough information to carry out the program at a reduced quality of 10%.
Prevention devices and techniques	Devices and techniques to prevent spillage of oil and hazardous materials should be developed. A study of industrial processes for determining changes for preventing spillage should be completed in FY 1972. A spill proof oil carriage or transport systems in FY 1973 should be developed. Reliability studies should be undertaken for the petroleum industry in FY 1971 and for hazardous materials in FY 1973. These studies should be updated and revised in FY 1974. A waste oil reception system and waste oil reuse system should be developed by FY 1973.	The proposed program is 60% of the optimum for FY 1971 resulting in a reduced study on the reliability of the petroleum industry.	This task will provide the technology for reducing the frequency of spill incidents. This task is carried out in cooperation with DOT, DOD, HEW, and Commerce as part of the National oil pollution control effort. The reduced effort will shift completion schedules.
Enforcement	Key Tasks: The preparation of evidence, the assessment of penalties, and the pursuit of legal actions against noncompliance with regulations developed in accordance with PL 91-224, violations of the Refuse Act of 1899, and water quality standards should be accomplished.	The proposed program reduces optimum effort 80%.	Enforcement of regulations will enhance the prevention and response tasks. This reduction will delay an aggressive effort to enforce regulations and will have an undetermined effect on the overall effort of prevention.
Federal Activities Coordination	Key Tasks: An effective spill prevention, control and response program should be developed and carried out to eliminate or reduce spill incidents in Federal installations under provisions of EO 11507. A fully operational spill response system for all high risk Federal installations should be developed by FY 1972 and a prevention and control program should be operational for all Federal installations by FY 1973.	This task is eliminated as activities proposed will be accomplished in conjunction with other Federal activities coordination tasks.	Federal facilities must at least keep pace with the private sector in abating pollution if the water quality goals are to be met. The elimination of this task will not lessen this effort but shift it to FAC rather than having it as a separate task.

TABLE 13 (continued)

OIL AND HAZARDOUS
MATERIALS SPILLS

ACTIVITY	OPTIMUM PROGRAM	PROPOSED PROGRAM	IMPACT
Manpower and Training	Key Tasks: A program should be developed to train Federal and State personnel in activities associated with spill response, prevention methods, techniques and inspection programs. Training for spill response should be accomplished by FY 1972 and for spill prevention by FY 1973. State personnel should be trained in response and prevention by FY 1974.	Same	Training will assure that properly instructed personnel respond to spill incidents. It will also provide field personnel with basic essential elements for spill response, control, and prevention.
Cost Study	Key Tasks: A study to find methods for accelerating construction of facilities to reduce spill incidents and determine liability limits for small on-shore oil storage facilities will be completed in FY 1971.	Same	Study findings will provide input to the prevention task.

OIL & HAZARDOUS MATERIALS
SPILLS
OPTIMUM PROGRAM


PROGRAM ELEMENTS
FY 71
FY 72
FY 73
ENFORCEMENT
MANPOWER & TRAINING
TECHNICAL SUPPORT
WATER QUALITY STANDARDS
PLANNING AND SYSTEMS ANALYSIS
RESEARCH, DEVELOPMENT & DEMONSTRATION
STATE PROGRAM GRANTS
CONSTRUCTION GRANTS
FEDERAL ACTIVITIES
CONGRESSIONAL ACTIONS
NON-FEDERAL SECTORS
OTHER FEDERAL AGENCIES
OPERATIVE ENFORCEMENT PROGRAM
TRAINING PROGRAM SPILL RESPONSE
TRAINING PROGRAM PREVENTION
REGULATIONS DEVELOPED
REVISE REGULATIONS
REVISE REGULATIONS
SPILL RESPONSE CONTINGENCY PLAN
STATE CONTINGENCY PLANS
CONTINGENCY PLANS-REVISED
COORDINATION
PREVENTION PROGRAM
PREVENTION OPERATIONAL
INTERSTATE STANDARDS FOR 21 STATES
APPROVED W.Q. STANDARDS FOR ALL STATES
FEDERAL REGULATIONS APPROVED
COST STUDY
EARLY PLANNING WITH SCREENING MODELS
STAGE I PLANNING COMPLETED
FATE AND EFFECTS-DISPERSANTS
KEY FISH AND WILDLIFE SPECIES
SUNKEN OIL
NEW TECHNIQUES TO CONTROL AND REMOVE OIL AND HAZ. MATERIALS
OIL TAGGING SYSTEM
SPILL RESPONSE-IDENTIFICATION OF SOURCE OF OIL
DEVELOP SEPERATOR
METHODS FOR BURIAL AND LANDFILL
DISPOSAL STATE-OF-THE ART
PREVENTION - PROCESS CHANGES
COMPLETE HAZ. MATERIALS RELIABILITY STUDY
SPILL RESPONSE FEDERAL INSTALLATIONS
PREVENTION PROGRAM OPERATIONAL FED. INSTALLAT'NS
NEW HAZ. MATERIALS LEGISLATION
STATE AND LOCAL SPILL RESPONSE CAPABILITY
STATE-MODEL REGULATIONS
DOT-US COAST GUARD

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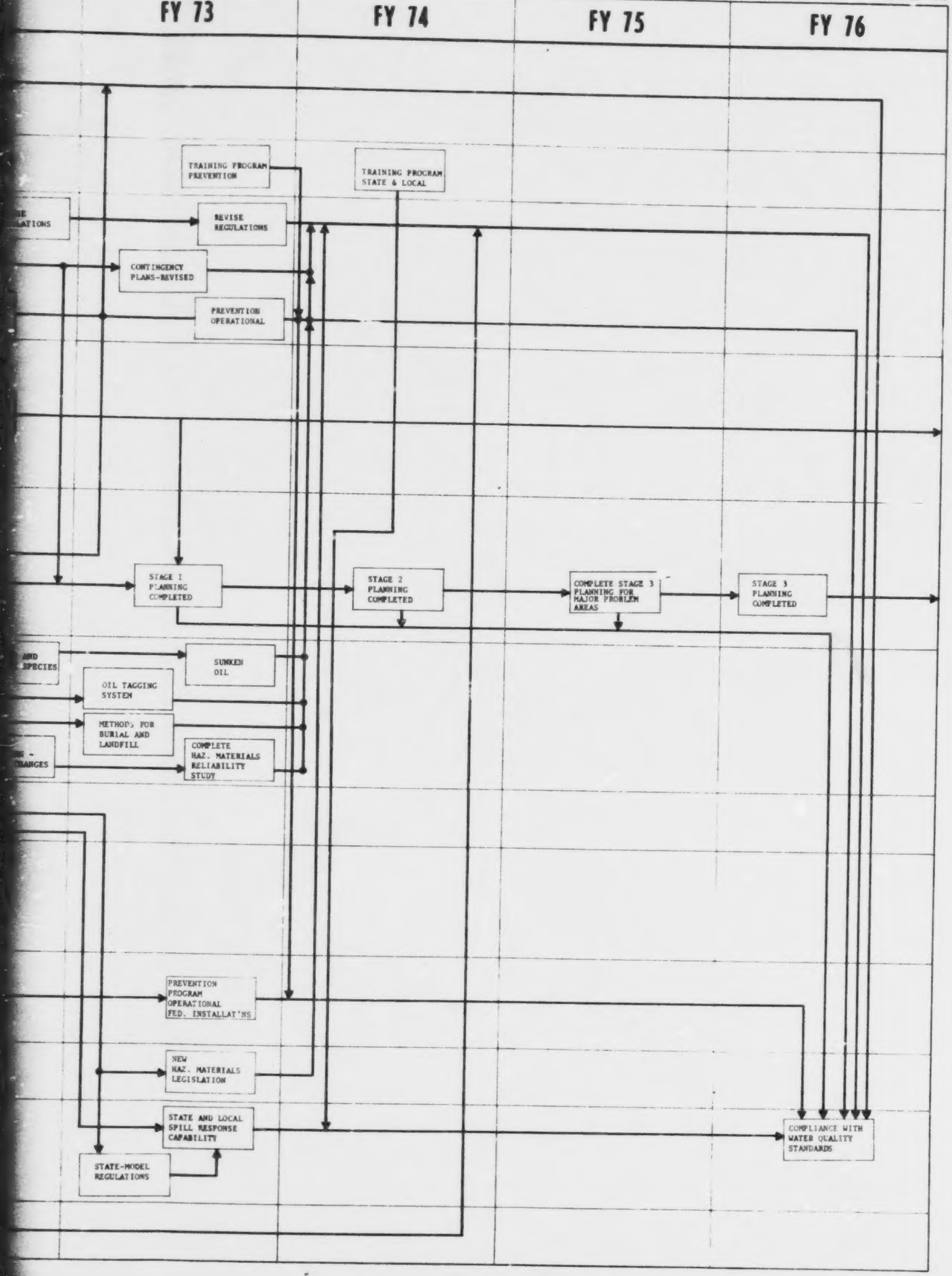
A

ARDOUS MATERIALS
SPILLS
UM PROGRAM

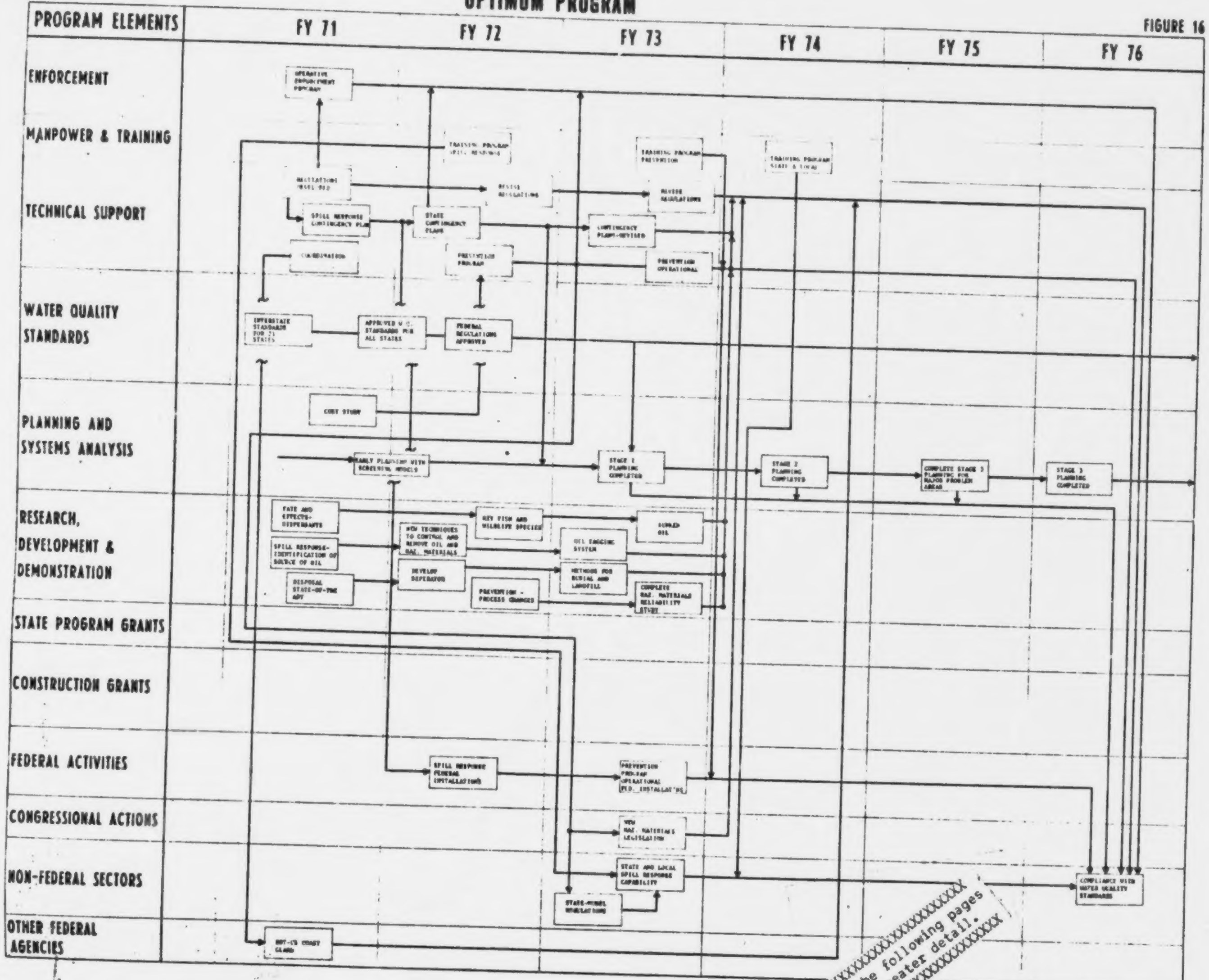
FIGURE 16


FY 73
FY 74
FY 75
FY 76
TRAINING PROGRAM PREVENTION
TRAINING PROGRAM STATE & LOCAL
ATIONS
REVISE REGULATIONS
CONTINGENCY PLANS-REVISED
PREVENTION OPERATIONAL
STAGE I PLANNING COMPLETED
STAGE 2 PLANNING COMPLETED
COMPLETE STAGE 3 PLANNING FOR MAJOR PROBLEM AREAS
STAGE 3 PLANNING COMPLETED
AND SPECIES
SUNKEN OIL
OIL TAGGING SYSTEM
METHODS FOR BURIAL AND LANDFILL
CHANGES
COMPLETE HAZ. MATERIALS RELIABILITY STUDY
PREVENTION PROGRAM OPERATIONAL FED. INSTALLAT'NS
NEW HAZ. MATERIALS LEGISLATION
STATE AND LOCAL SPILL RESPONSE CAPABILITY
STATE-MODEL REGULATIONS
COMPLIANCE WITH WATER QUALITY STANDARDS

B

OIL & HAZARDOUS MATERIALS
SPILLS
OPTIMUM PROGRAM

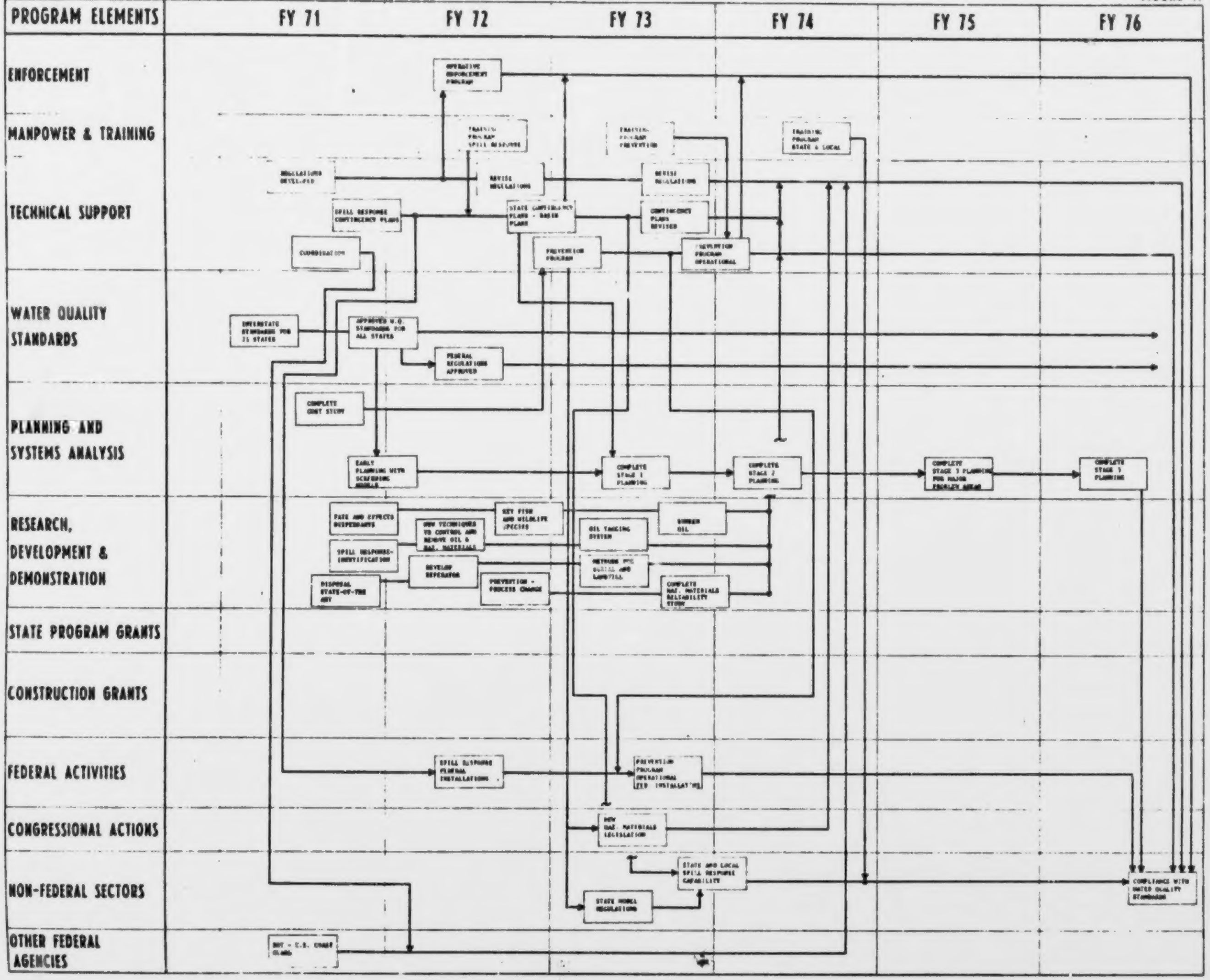
FIGURE 16


PROGRAM ELEMENTS
FY 71
FY 72
FY 73
FY 74
FY 75
FY 76
ENFORCEMENT
MANPOWER & TRAINING
TECHNICAL SUPPORT
WATER QUALITY STANDARDS
PLANNING AND SYSTEMS ANALYSIS
RESEARCH, DEVELOPMENT & DEMONSTRATION
STATE PROGRAM GRANTS
CONSTRUCTION GRANTS
FEDERAL ACTIVITIES
CONGRESSIONAL ACTIONS
NON-FEDERAL SECTORS
OTHER FEDERAL AGENCIES
OPERATIVE ENFORCEMENT PROGRAM
TRAINING PROGRAM SPILL RESPONSE
TRAINING PROGRAM PREVENTION
TRAINING PROGRAM STATE & LOCAL
REGULATIONS (SEC. 102)
REVISE REGULATIONS
REVISE REGULATIONS
SPILL RESPONSE CONTINGENCY PLAN
STATE CONTINGENCY PLANS
CONTINGENCY PLANS-REVISED
COORDINATION
PREVENTION PROGRAM
PREVENTION OPERATIONAL
INTERSTATE STANDARDS FOR 21 STATES
APPROVED W.Q. STANDARDS FOR ALL STATES
FEDERAL REGULATIONS APPROVED
COST STUDY
EARLY PLANNING WITH SCREENING MODELS
STAGE 1 PLANNING COMPLETED
STAGE 2 PLANNING COMPLETED
COMPLETE STAGE 3 PLANNING FOR MAJOR PROBLEM AREAS
STAGE 3 PLANNING COMPLETED
FATE AND EFFECTS-DISPERSANTS
SPILL RESPONSE-IDENTIFICATION OF SOURCE OF OIL
DISPOSAL STATE-OF-THE ART
NEW TECHNIQUES TO CONTROL AND REMOVE OIL AND HAZ. MATERIALS
DEVELOP SEPERATOR
KEY FISH AND WILDLIFE SPECIES
OIL TAGGING SYSTEM
METHODS FOR BURIAL AND LANDFILL
PREVENTION - PROCESS CHANGES
SUNKEN OIL
COMPLETE HAZ. MATERIALS RELIABILITY STUDY
SPILL RESPONSE FEDERAL INSTALLATIONS
PREVENTION PROGRAM OPERATIONAL FED. INSTALLAT'NS
NEW HAZ. MATERIALS LEGISLATION
STATE AND LOCAL SPILL RESPONSE CAPABILITY
STATE-MODEL REGULATIONS
DOT-CG COAST GUARD
COMPLIANCE WITH WATER QUALITY STANDARDS

XXXXXXXXXXXXXXXXXXXXXXX
See the following pages
for greater detail.
XXXXXXXXXXXXXXXXXXXXXXX

OIL & HAZARDOUS MATERIAL SPILLS
PROPOSED PROGRAM

FIGURE 17


PROGRAM ELEMENTS
FY 71
FY 72
FY 73
FY 74
FY 75
FY 76
ENFORCEMENT
MANPOWER & TRAINING
TECHNICAL SUPPORT
WATER QUALITY STANDARDS
PLANNING AND SYSTEMS ANALYSIS
RESEARCH, DEVELOPMENT & DEMONSTRATION
STATE PROGRAM GRANTS
CONSTRUCTION GRANTS
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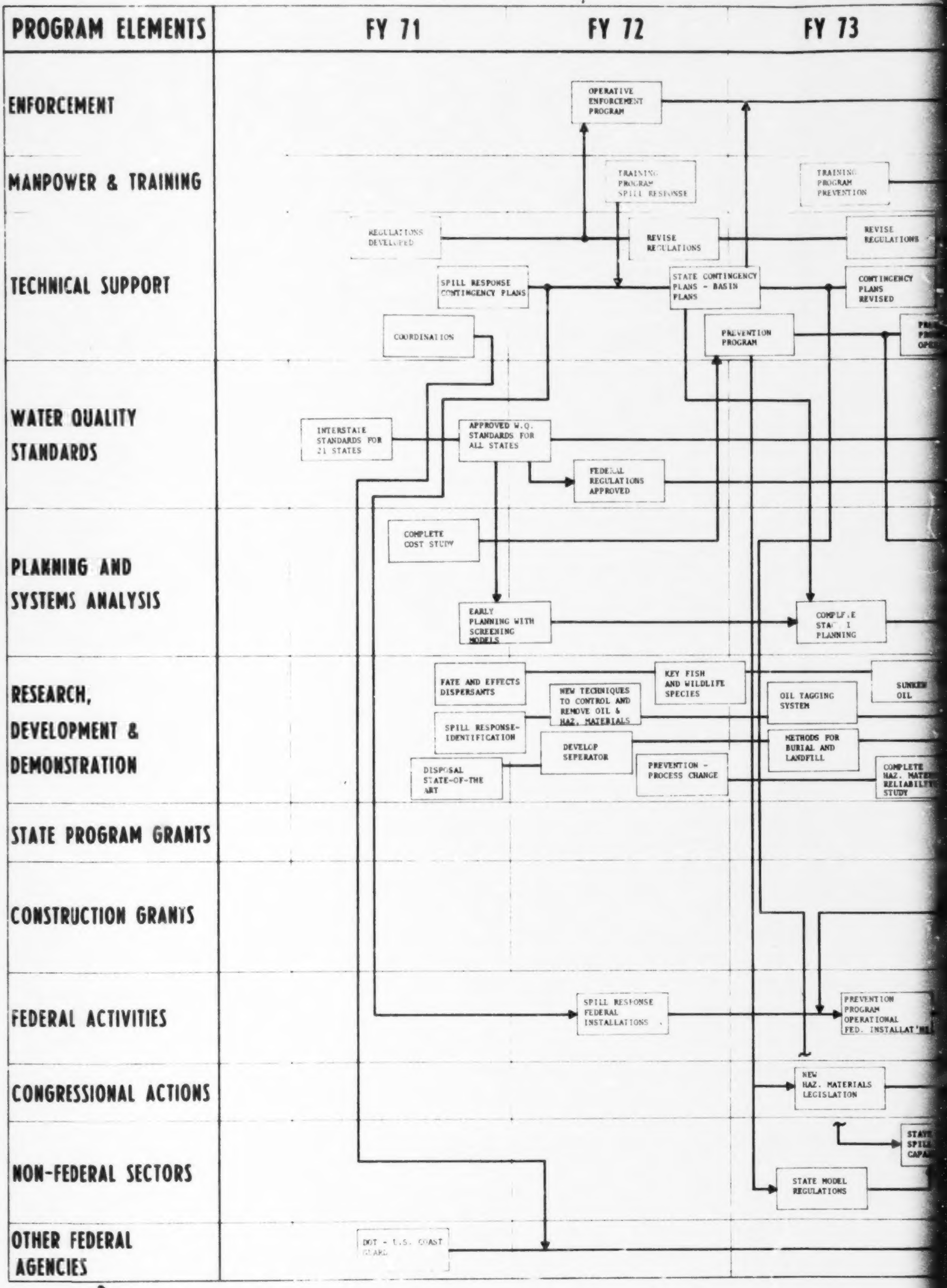
OTHER FEDERAL AGENCIES
OPERATIVE ENFORCEMENT PROGRAM
TRAINING PROGRAM SPILL RESPONSE
TRAINING PROGRAM PREVENTION
TRAINING PROGRAM STATE & LOCAL
REGULATIONS DEVELOPED
REVISE REGULATIONS
REVISE REGULATIONS
SPILL RESPONSE CONTINGENCY PLANS
STATE CONTINGENCY PLANS - BASIN PLANS
CONTINGENCY PLANS REVISED
COORDINATION
PREVENTION PROGRAM
PREVENTION PROGRAM OPERATIONAL
INTERSTATE STANDARDS FOR 21 STATES
APPROVED W.Q. STANDARDS FOR ALL STATES
FEDERAL REGULATIONS APPROVED
COMPLETE COST STUDY
EARLY PLANNING WITH SCREENING MODELS
COMPLETE STAGE 1 PLANNING
COMPLETE STAGE 2 PLANNING
COMPLETE STAGE 3 PLANNING FOR MAJOR PROBLEM AREAS
COMPLETE STAGE 3 PLANNING
FATE AND EFFECTS DISPERSANTS
NEW TECHNIQUES TO CONTROL AND REMOVE OIL & HAZ. MATERIALS
KEY FISH AND WILDLIFE SPECIES
SUNKEN OIL
OIL TAGGING SYSTEM
SPILL RESPONSE-IDENTIFICATION
DEVELOP SEPERATOR
METHODS FOR BURIAL AND LANDFILL
DISPOSAL STATE-OF-THE ART
PREVENTION - PROCESS CHANGE
COMPLETE HAZ. MATERIALS RELIABILITY STUDY
SPILL RESPONSE FEDERAL INSTALLATIONS
PREVENTION PROGRAM OPERATIONAL FED INSTALLAT'NS
NEW HAZ. MATERIALS LEGISLATION
STATE AND LOCAL SPILL RESPONSE CAPABILITY
STATE MODEL REGULATIONS
COMPLIANCE WITH WATER QUALITY STANDARDS
DOT - U.S. COAST GUARD

OIL & HAZARDOUS MATERIAL
PROPOSED PROGRAM


PROGRAM ELEMENTS
FY 71
FY 72
FY 73
ENFORCEMENT
MANPOWER & TRAINING
TECHNICAL SUPPORT
WATER QUALITY STANDARDS
PLANNING AND SYSTEMS ANALYSIS
RESEARCH, DEVELOPMENT & DEMONSTRATION
STATE PROGRAM GRANTS
CONSTRUCTION GRANTS
FEDERAL ACTIVITIES
CONGRESSIONAL ACTIONS
NON-FEDERAL SECTORS
OTHER FEDERAL AGENCIES
OPERATIVE ENFORCEMENT PROGRAM
TRAINING PROGRAM SPILL RESPONSE
TRAINING PROGRAM PREVENTION
REGULATIONS DEVELOPED
REVISE REGULATIONS
REVISE REGULATIONS
SPILL RESPONSE CONTINGENCY PLANS
STATE CONTINGENCY PLANS - BASIN PLANS
CONTINGENCY PLANS REVISED
COORDINATION
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INTERSTATE STANDARDS FOR 21 STATES
APPROVED W.Q. STANDARDS FOR ALL STATES
FEDERAL REGULATIONS APPROVED
COMPLETE COST STUDY
EARLY PLANNING WITH SCREENING MODELS
COMPLETE STAGE I PLANNING
FATE AND EFFECTS DISPERSANTS
NEW TECHNIQUES TO CONTROL AND REMOVE OIL & HAZ. MATERIALS
KEY FISH AND WILDLIFE SPECIES
SUNKEN OIL
OIL TAGGING SYSTEM
SPILL RESPONSE-IDENTIFICATION
DEVELOP SEPERATOR
METHODS FOR BURIAL AND LANDFILL
DISPOSAL STATE-OF-THE ART
PREVENTION - PROCESS CHANGE
COMPLETE HAZ. MATE RELIABILIT STUDY
SPILL RESPONSE FEDERAL INSTALLATIONS
PREVENTION PROGRAM OPERATIONAL FED. INSTALLAT'NS
NEW HAZ. MATERIALS LEGISLATION
STATE SPILL CAPA
STATE MODEL REGULATIONS
DOT - U.S. COAST GUARD

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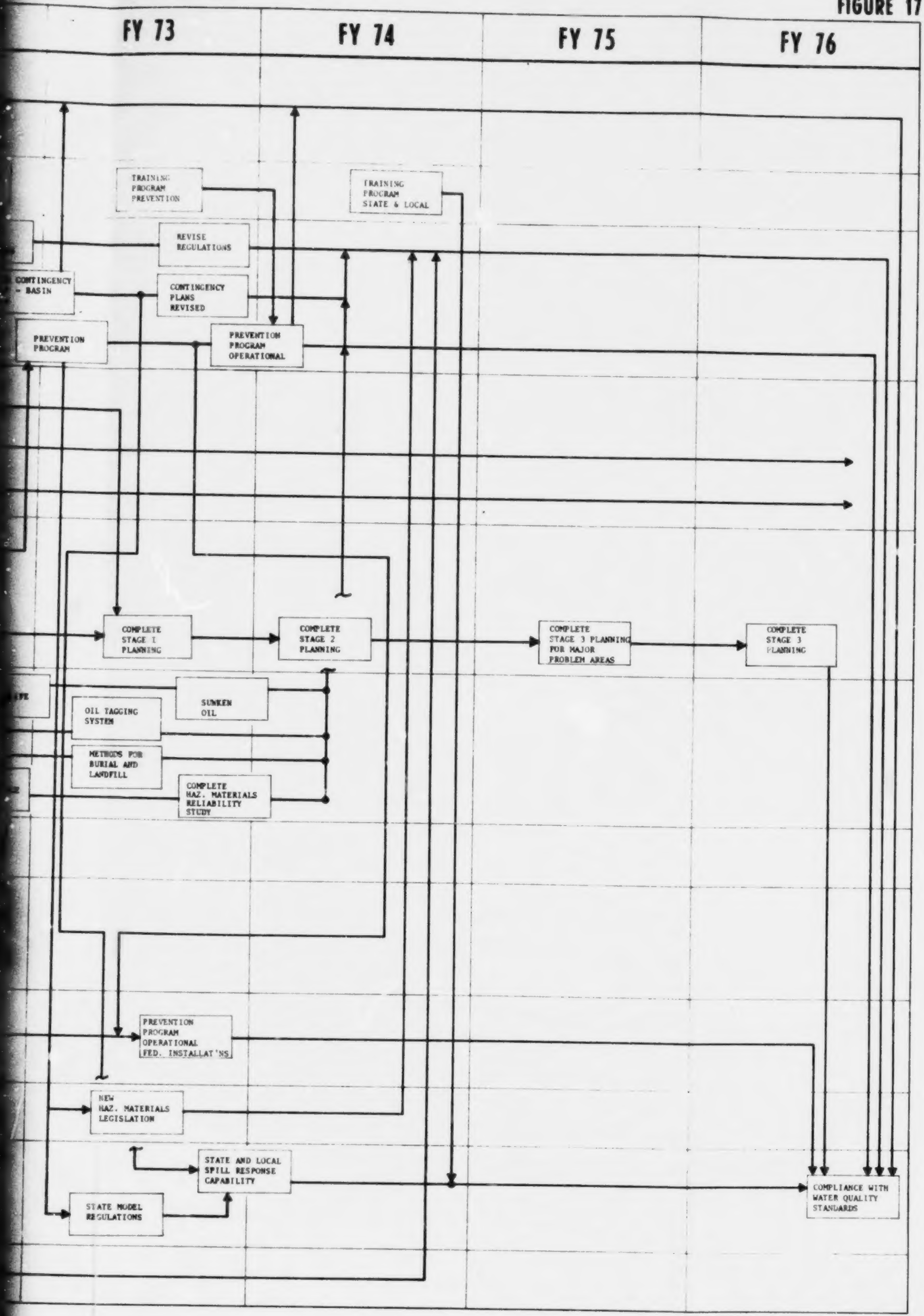
A

ZARDOUS MATERIAL SPILLS
ROPOSED PROGRAM

FIGURE 17


FY 73
FY 74
FY 75
FY 76
TRAINING PROGRAM PREVENTION
TRAINING PROGRAM STATE & LOCAL
REVISE REGULATIONS
CONTINGENCY - BASIN
CONTINGENCY PLANS REVISED
PREVENTION PROGRAM
PREVENTION PROGRAM OPERATIONAL
COMPLETE STAGE 1 PLANNING
COMPLETE STAGE 2 PLANNING
COMPLETE STAGE 3 PLANNING FOR MAJOR PROBLEM AREAS
COMPLETE STAGE 3 PLANNING
SUNKEN OIL
OIL TAGGING SYSTEM
METHODS FOR BURIAL AND LANDFILL
COMPLETE HAZ. MATERIALS RELIABILITY STUDY
PREVENTION PROGRAM OPERATIONAL FED. INSTALLAT'NS
NEW HAZ. MATERIALS LEGISLATION
STATE AND LOCAL SPILL RESPONSE CAPABILITY
STATE MODEL REGULATIONS
COMPLIANCE WITH WATER QUALITY STANDARDS

B

4.6 WASTES FROM MINING AND WELLS

4.6.1 SUMMARY OF PROBLEM AND STRATEGY FOR ITS SOLUTION

Annually some 500 billion gallons of mine drainage containing millions of tons of acids, acid salts, or alkali salts degrade over 10,000 miles of surface streams and more than 15,000 acres of impounded waters. Mine drainage pollution results in unsightly deposits of residues on beds and banks of streams; and, in many cases, toxic components of the drainage destroy all fish and aquatic plants in the stream. Tailings piles from all types of mining degrade the landscape and through surface drainage add chemicals and silt to streams and lakes. Mineral preparation operations produce silt, slimes and chemically-degraded water in addition to their intended products. Oil extraction operations yield drilling muds and salt brines as well as oil. The Alaskan North Slope oil development presents an unexpectedly difficult problem due to the fragility of the tundra environment. Pollutants from mining and oil development most usually occur in rural and wilderness areas which would otherwise have great potential for recreational developments. Thus a significant decrease in land and resource values may be associated with this type of pollution. Of greater significance is the potential for pollution of the ground water.

Since about three-fourths of the mine drainage problem is caused by nonoperating mines, for which responsibility cannot easily be determined (if at all) the most expedient program for abatement is projected to be a public works program. Because of the limited dependable technology available, it is considered beyond reason to initiate immediately a massive funding program, since most construction would be of an exploratory nature, with an estimated 30 percent effectiveness resulting from an attempted 100 percent control program.

With a few specific exceptions, the technology for controlling wastes from mineral preparation operations is now available. Technological methods of control have been advanced in water scarce areas of the nation where the preparation plant's continued

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existence has depended on water conservation. Additionally, progress has been made in areas and States where local demand has required consideration of waste water control.

Nontechnological control methods are of significant importance in this problem component. The establishment of appropriate State requirements and strict enforcement of these requirements should result in substantial compliance with water quality standards over a very brief interval.

There are presently two methods to control the problem of brine pollution from oil production. Past experience has shown that larger operations can effectively and less expensively reinject the brine back into the oil-bearing strata; this disposes of the brine and also maintains the pressure in the strata which allows the field to produce more oil, thus extending its useful life. An alternative approach is to treat all of the wastes using existing demineralization technology, thus recovering potable water and a more concentrated brine or solid waste. Enforcement is the major task in abatement of this type of pollution.

Even proceeding with unlimited financial resources, adequate technological information for initiating a nationwide effective abatement program will not be available until late FY 1975, two years after water quality standards have been developed. By this time, probably only 60 percent of the total new technology will have been developed and tested. Some preliminary demonstration results will be available in FY 1973, but the risk of designing an entire attack on the problem with these limited tools is high. Abatement schedules and a national impact assessment will have been completed in FY 1975.

Water quality criteria for acidity and metallic elements in drainage from metal ore mines is required by FY 1973. The water quality standards implementation plans must be reviewed and expanded by FY 1976 to include all mines and wells of established ownership.

Plans for abatement activities must develop implementation needs on a priority basis for active mines by FY 1973 and abandoned mines by FY 1975.

Enforcement will develop a model mining law in FY 1972 for implementing State and Federal agencies. There will be a continuing backup for States in obtaining compliance for operating mines from FY 1973 on.

Federal Activities Coordination will undertake in FY 1972 a program to work with the Federal leasing agencies to provide pollution control measures in all leases.

Research, Development, and Demonstration will demonstrate by FY 1973 how existing knowledge can be used to control mine drainage in discrete areas, and develop control measures for abandoned mines. Sixty percent of this needed technology is expected by FY 1976.

Manpower and Training will initiate a series of short courses for technological and legal training of mining, civil and chemical engineers, geologists, and hydrologists in mine control technology starting in FY 1971.

Technical Support will analyze the data available by FY 1972 and obtain inventory data on operating mines by FY 1973. Base information will be complete for abandoned mines by FY 1975.

State Program Grants will be used to increase the State capabilities by increasing the staffs of the States by 400 professionals by FY 1973 for active mines, and 600 additional staff for abandoned mine program in FY 1976.

Mining grants for control of abandoned mine discharge are planned for FY 1976 depending on Congressional action.

4.6.2 ANTICIPATED ACCOMPLISHMENTS FOR PROPOSED PROGRAM

Fiscal Year 1971

- Proposed legislation for financial assistance to States for the control of abandoned mine discharge (mining grants).

- Analyze available mine data.

Fiscal Year 1972

- Adopt State model mining laws.

- Include pollution control measures in leases from Federal leasing agencies.

- Initiate short courses for technological and legal training in pollution control for mines.

Fiscal Year 1973-1976

- Enforce regulations and laws.
- Update short courses.
- Complete data analysis in key areas.
- Complete preliminary basin plans for implementation of mine controls.
- Provide water quality criteria for private sector mines.
- Demonstrate RD&D results on selected mines.
- Begin State mine inspections for compliance to regulations and laws.
- Complete data analysis and basin implementation planning.
- Demonstrate control measures for abandoned mines.
- Develop minimum adequate new technology.
- Start Federal grant program if legislation passed.
- Achieve compliance with water quality standards by active mines.

4.6.3 SUMMARY OF PROGRAMS

Major milestones and interrelationships of the optimum and proposed programs are shown in Figures 18 and 19 respectively. Differences in the levels of accomplishment for the programs are shown in Table 14.

TABLE 14

MINING
AND WELLS

ACTIVITY	OPTIMUM PROGRAM	PROPOSED PROGRAM	IMPACT
Water Quality Standards	Key Tasks Related to Mining		
	Develop criteria for metallic ions and acidity	Same as optimum	Provides operational definition of quality conditions which are to be met
	Review and expand implementation plans to include all mines	Same as optimum	
Basin Planning and Systems Analysis	Key Tasks Related to Mining		
	Develop implementation needs on a priority basis for: - active mines, FY 1973 - abandoned mines, FY 1975	Same as optimum if budget supplement for FY 1971 approved	Defines problems and sources on a priority basis and provides implementation schedule consistent with compliance by active mines by end of FY 1974
Enforcement			
Legal Actions	Provide backup to States in operating mine control	Same as optimum	Provides support to controlling active mines by end of FY 1974
Model Law	Review existing mining law, develop model law	Same as optimum	Provides tools for proceeding against active mines on effective and timely basis
Federal Activities Coordination			
E. O. 11507	Provide review, technical support and regulatory actions with respect to annual leasing permits	Provide desktop review of new permits.	Provides control for mineral exploitation undertaken under Federal control for some 100,000 existing leases and new leases on a current basis through responsible Federal agencies
Regulations	Assist in implementing model law principles into leasing arrangements for mineral exploitation of Federal lands and areas under Federal control	Same as optimum	Apply environmental quality control principles through leasing arrangements and mining technology.
	Implement positive programs for interacting with Bureau of Mines	Initiate meaningful dialogue for cooperation.	

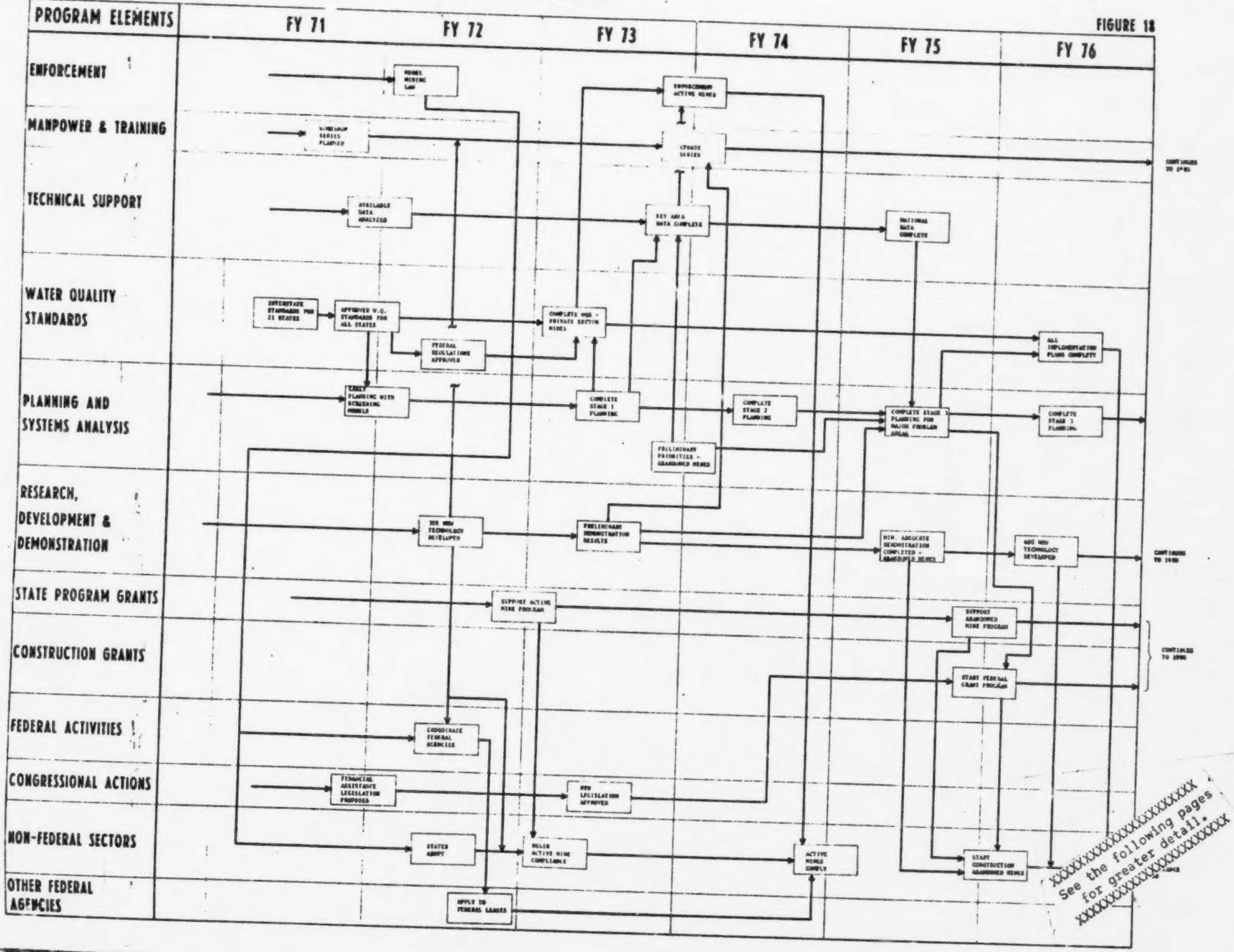
TABLE 14 (continued)

MINING
AND WELLS

ACTIVITY	OPTIMUM PROGRAM	PROPOSED PROGRAM	IMPACT
Research, Development and Demonstration			
Mine Drainage Treatment	Continue to develop promising techniques for interim use at abandoned mines and for operating mines	Program shifted to begin in FY 1973 rather than FY 1971 due to resource constraints	Technology currently exists to meet optimum program goals for operating mines. Delay in developing new technology will result in higher costs of control. Effect of reductions in these three RD & D areas is to reduce technological availability of demonstrated controls to be applied under construction assistance program and to increase costs. Cannot start construction assistance program on large scale until FY 1976 at earliest
Nonoperating Mines	Continue to seek permanent, economical solutions to this problem and demonstrate results for full application in FY 1975	Program reduced by 50% resulting in lesser number of demonstrated technologies by FY 1975	
Mine Closing Procedures	Develop promising methods in FY 1973. Develop and demonstrate 60% of all needed new technology by FY 1975	Same as above; 60% new technology not available until FY 1978	
Mining Methods	Provide substantial research effort to examine new mining methods for pollution abatement impacts, develop and demonstrate most promising. Initial results, FY 1973; significant new technology, FY 1975.	Same as above Significant new teachnology not available until after FY 1976	
Manpower Development and Training	Train 1,000 professionals through specialized courses by 1976 through short course program. Provide support to 400 additional professionals by graduate training support	Deferred one year because of delayed full scale assistance program shift necessitated by RD & D reduction	No direct impact on objective unless RD & D restored to full funding level
Technical Support	Develop base information on location, pollution contribution and hydrologic, geologic and physical aspects of abandoned mine pollution as basis for cost-effective problem solution by FY 1975.	Program reduced by 50% due to resource constraints	Reduces effectiveness of construction assistance program by 50% through lower level of information for planning program
	Provide inventory data on operating mines by FY 1973.	Minimal data collection on operating mines.	Reduces data loss for meeting active mine compliance.
	Provide monitoring of sources at some 10,000 sites between FY 1971-1973.	Minimal at source monitoring.	Increased uncertainty as to efficacy of controls with decreased monitoring
State Program Grants	Provide incentive, direction and support for 400 additional staff by FY 1973 and 600 more by FY 1976 to implement State responsibilities under operating mine and abandoned mine programs.	Resources not explicitly budgeted for this task; performance will be dependent upon allocation of total general purpose State Program grants.	Probability of meeting FY 1974 active mine compliance diminished by half; most likely compliance date without this program is 1980.
Construction Grants - Mining	Provide grant support at 95% Federal share for abatement of abandoned mines where responsibility for damages cannot legally be placed. Begin at a modest level in FY 1973 reaching $1 billion per year level in FY 1976.	Full scale construction assistance program shifted to begin after FY 1976 due to reductions in RD & D and Technology Support; minimum adequate technology to start not available until FY 1976.	Delay start of full scale attack on abandoned mine problem by one year. Not considered significant in terms of optimum 1990 compliance date.

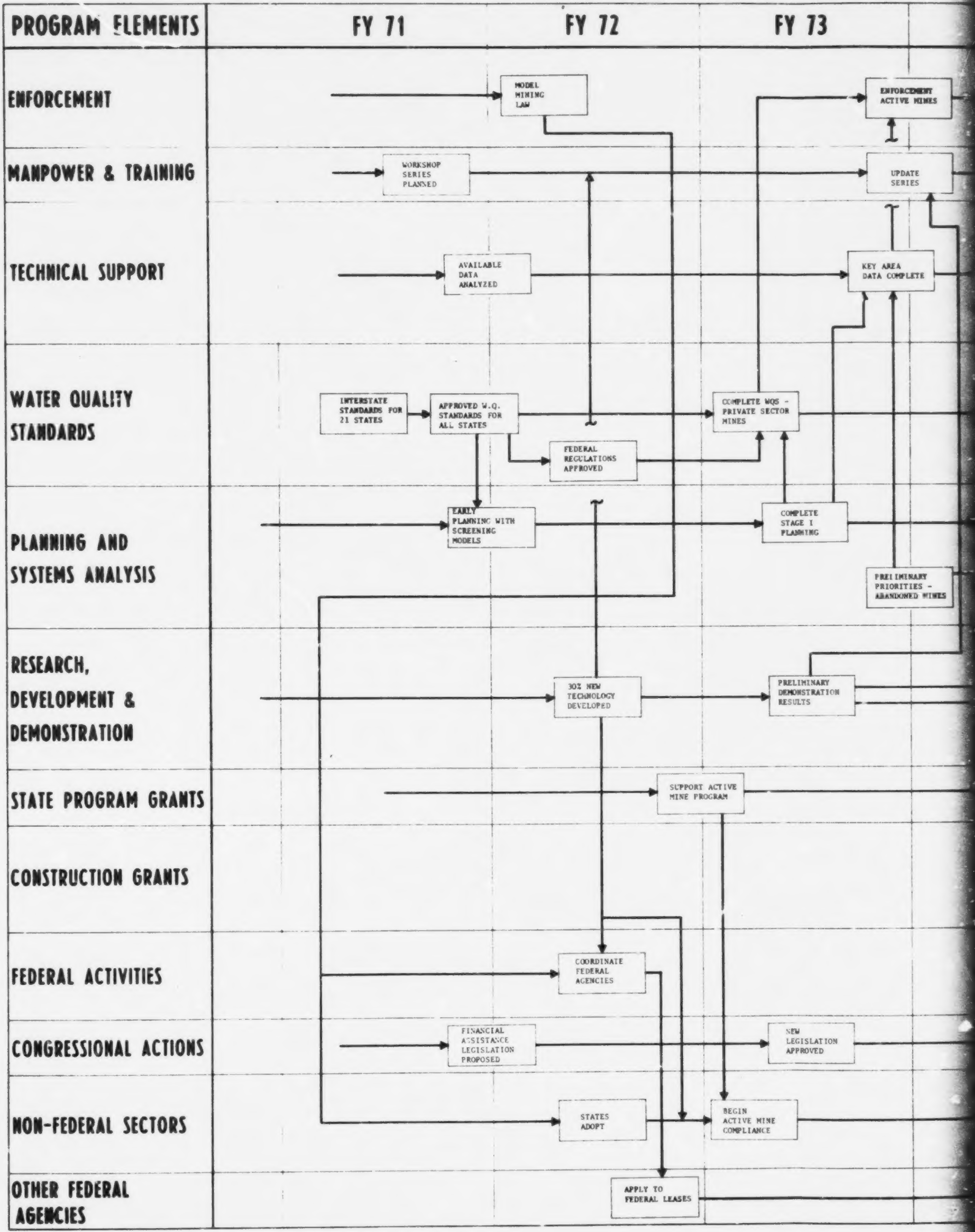
MINING AND WELLS
OPTIMUM PROGRAM

FIGURE 18


PROGRAM ELEMENTS
FY 71
FY 72
FY 73
FY 74
FY 75
FY 76
ENFORCEMENT
MANPOWER & TRAINING
TECHNICAL SUPPORT
WATER QUALITY STANDARDS
PLANNING AND SYSTEMS ANALYSIS
RESEARCH, DEVELOPMENT & DEMONSTRATION
STATE PROGRAM GRANTS
CONSTRUCTION GRANTS
FEDERAL ACTIVITIES
CONGRESSIONAL ACTIONS
NON-FEDERAL SECTORS
OTHER FEDERAL AGENCIES
MODEL MINING LAW
WORKSHOP SERIES PLANNED
AVAILABLE DATA ANALYZED
INTERSTATE STANDARDS FOR 21 STATES
APPROVED W.Q. STANDARDS FOR ALL STATES
FEDERAL REGULATIONS APPROVED
EARLY PLANNING WITH SCREENING MODELS
30% NEW TECHNOLOGY DEVELOPED
SUPPORT ACTIVE MINE PROGRAM
COORDINATE FEDERAL AGENCIES
FINANCIAL ASSISTANCE LEGISLATION PROPOSED
STATES ADOPT
APPLY TO FEDERAL LEASES
COMPLETE WQS - PRIVATE SECTOR MINES
COMPLETE STAGE I PLANNING
PRELIMINARY DEMONSTRATION RESULTS
NEW LEGISLATION APPROVED
BEGIN ACTIVE MINE COMPLIANCE
ENFORCEMENT ACTIVE MINES
UPDATE SERIES
KEY AREA DATA COMPLETE
PRELIMINARY PRIORITIES - ABANDONED MINES
COMPLETE STAGE 2 PLANNING
ACTIVE MINES COMPLY
NATIONAL DATA COMPLETE
COMPLETE STAGE 3 PLANNING FOR MAJOR PROBLEM AREAS
MIN. ADEQUATE DEMONSTRATION COMPLETED - ABANDONED MINES
SUPPORT ABANDONED MINE PROGRAM
START FEDERAL GRANT PROGRAM
START CONSTRUCTION ABANDONED MINES
ALL IMPLEMENTATION PLANS COMPLETE
COMPLETE STAGE 3 PLANNING
60% NEW TECHNOLOGY DEVELOPED
CONTINUES TO 1980
CONTINUES TO 1980
CONTINUES TO 1980

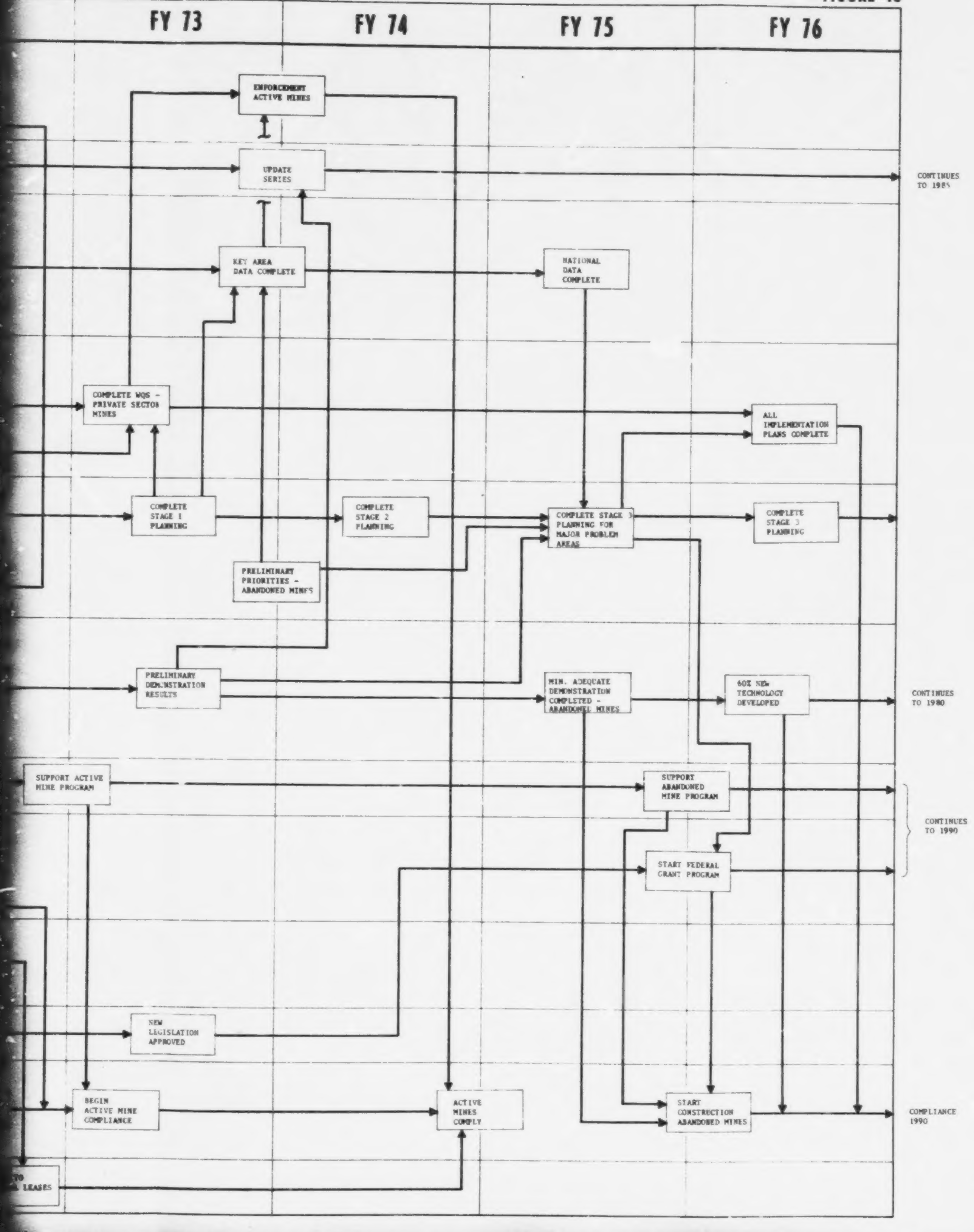
XXXXXXXXXXXXXXXXXXXXXX
See the following pages
for greater detail.
XXXXXXXXXXXXXXXXXXXXXX

MINING AND WELLS
OPTIMUM PROGRAM


PROGRAM ELEMENTS
FY 71
FY 72
FY 73
ENFORCEMENT
MANPOWER & TRAINING
TECHNICAL SUPPORT
WATER QUALITY STANDARDS
PLANNING AND SYSTEMS ANALYSIS
RESEARCH, DEVELOPMENT & DEMONSTRATION
STATE PROGRAM GRANTS
CONSTRUCTION GRANTS
FEDERAL ACTIVITIES
CONGRESSIONAL ACTIONS
NON-FEDERAL SECTORS
OTHER FEDERAL AGENCIES
MODEL MINING LAW
ENFORCEMENT ACTIVE MINES
WORKSHOP SERIES PLANNED
UPDATE SERIES
AVAILABLE DATA ANALYZED
KEY AREA DATA COMPLETE
INTERSTATE STANDARDS FOR 21 STATES
APPROVED W.Q. STANDARDS FOR ALL STATES
COMPLETE WQS - PRIVATE SECTOR MINES
FEDERAL REGULATIONS APPROVED
EARLY PLANNING WITH SCREENING MODELS
COMPLETE STAGE I PLANNING
PRELIMINARY PRIORITIES - ABANDONED MINES
30% NEW TECHNOLOGY DEVELOPED
PRELIMINARY DEMONSTRATION RESULTS
SUPPORT ACTIVE MINE PROGRAM
COORDINATE FEDERAL AGENCIES
FINANCIAL ASSISTANCE LEGISLATION PROPOSED
NEW LEGISLATION APPROVED
STATES ADOPT
BEGIN ACTIVE MINE COMPLIANCE
APPLY TO FEDERAL LEASES

G AND WELLS
UM PROGRAM

FIGURE 18



FY 73
FY 74
FY 75
FY 76
ENFORCEMENT ACTIVE MINES
UPDATE SERIES
CONTINUES TO 1985
KEY AREA DATA COMPLETE
NATIONAL DATA COMPLETE
COMPLETE WQS - PRIVATE SECTOR MINES
ALL IMPLEMENTATION PLANS COMPLETE
COMPLETE STAGE I PLANNING
COMPLETE STAGE 2 PLANNING
COMPLETE STAGE 3 PLANNING FOR MAJOR PROBLEM AREAS
COMPLETE STAGE 3 PLANNING
PRELIMINARY PRIORITIES - ABANDONED MINES
PRELIMINARY DEMONSTRATION RESULTS
MIN. ADEQUATE DEMONSTRATION COMPLETED - ABANDONED MINES
60% NEW TECHNOLOGY DEVELOPED
CONTINUES TO 1980
SUPPORT ACTIVE MINE PROGRAM
SUPPORT ABANDONED MINE PROGRAM
CONTINUES TO 1990
START FEDERAL GRANT PROGRAM
NEW LEGISLATION APPROVED
BEGIN ACTIVE MINE COMPLIANCE
ACTIVE MINES COMPLY
START CONSTRUCTION ABANDONED MINES
COMPLIANCE 1990
TO
LEASES

B

MINING AND WELLS
PROPOSED PROGRAM

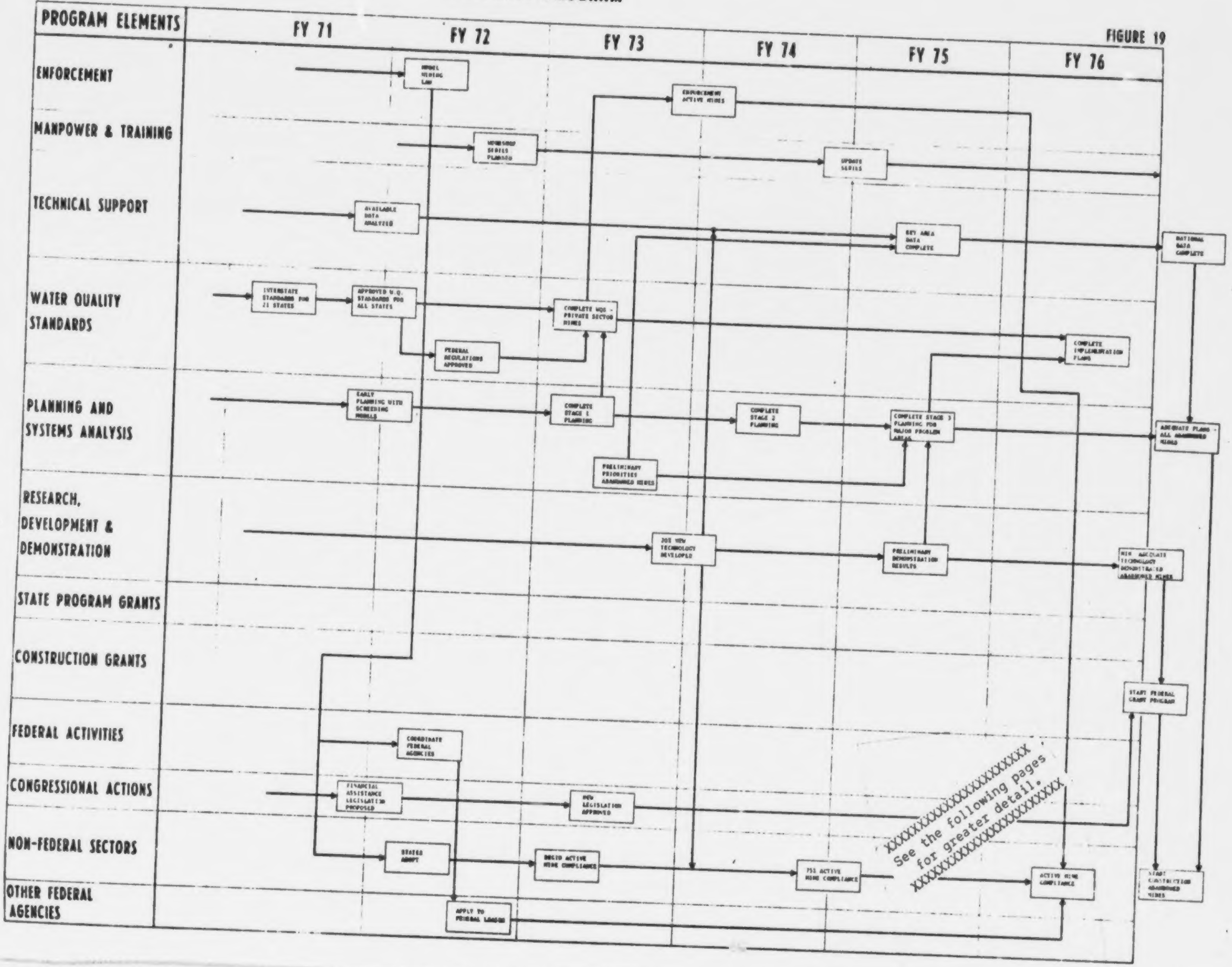
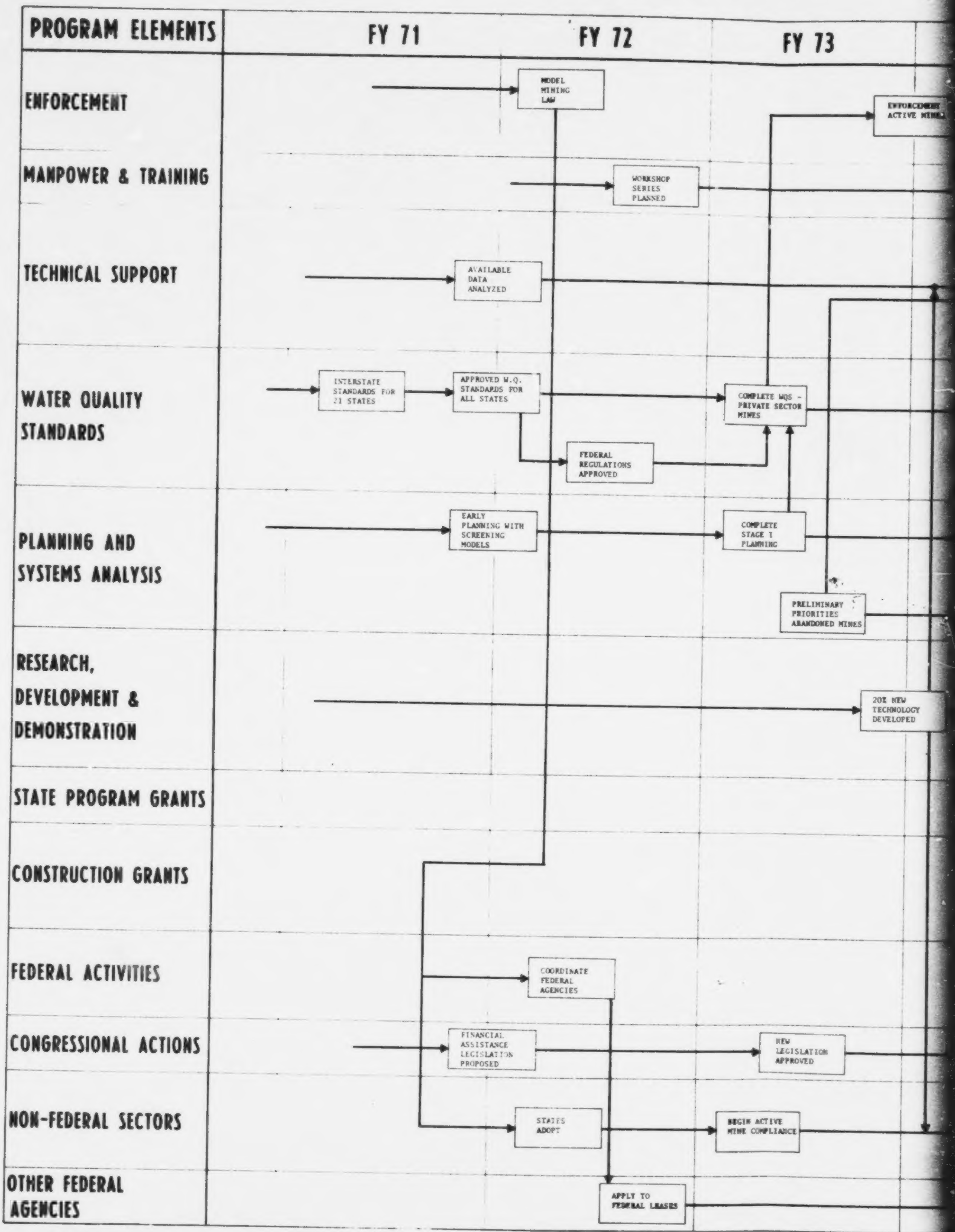

PROGRAM ELEMENTS
FY 71
FY 72
FY 73
FY 74
FY 75
FY 76
ENFORCEMENT
MANPOWER & TRAINING
TECHNICAL SUPPORT
WATER QUALITY STANDARDS
PLANNING AND SYSTEMS ANALYSIS
RESEARCH, DEVELOPMENT & DEMONSTRATION
STATE PROGRAM GRANTS
CONSTRUCTION GRANTS
FEDERAL ACTIVITIES
CONGRESSIONAL ACTIONS
NON-FEDERAL SECTORS
OTHER FEDERAL AGENCIES
MODEL MINING LAW
ENFORCEMENT ACTIVE MINES
WORKSHOP SERIES PLANNED
UPDATE SERIES
AVAILABLE DATA ANALYZED
KEY AREA DATA COMPLETE
NATIONAL DATA COMPLETE
INTERSTATE STANDARDS FOR 21 STATES
APPROVED W.Q. STANDARDS FOR ALL STATES
FEDERAL REGULATIONS APPROVED
COMPLETE WQS - PRIVATE SECTOR MINES
COMPLETE IMPLEMENTATION PLANS
EARLY PLANNING WITH SCREENING MODELS
COMPLETE STAGE 1 PLANNING
COMPLETE STAGE 2 PLANNING
COMPLETE STAGE 3 PLANNING FOR MAJOR PROBLEM AREAS
ADEQUATE PLANS - ALL ABANDONED MINES
PRELIMINARY PRIORITIES ABANDONED MINES
20% NEW TECHNOLOGY DEVELOPED
PRELIMINARY DEMONSTRATION RESULTS
NEW ADEQUATE TECHNOLOGY DEMONSTRATED ABANDONED MINES
START FEDERAL GRANT PROGRAM
COORDINATE FEDERAL AGENCIES
FINANCIAL ASSISTANCE LEGISLATION PROPOSED
NEW LEGISLATION APPROVED
STATES ADOPT
BEGIN ACTIVE MINE COMPLIANCE
75% ACTIVE MINE COMPLIANCE
ACTIVE MINE COMPLIANCE
START CONSTRUCTION ABANDONED MINES
APPLY TO FEDERAL LOANS

FIGURE 19

XXXXXXXXXXXXXXXXXXXXX
See the following pages
for greater detail.
XXXXXXXXXXXXXXXXXXXXX

MINING AND WELLS
PROPOSED PROGRAM


PROGRAM ELEMENTS
FY 71
FY 72
FY 73
ENFORCEMENT
MANPOWER & TRAINING
TECHNICAL SUPPORT
WATER QUALITY STANDARDS
PLANNING AND SYSTEMS ANALYSIS
RESEARCH, DEVELOPMENT & DEMONSTRATION
STATE PROGRAM GRANTS
CONSTRUCTION GRANTS
FEDERAL ACTIVITIES
CONGRESSIONAL ACTIONS
NON-FEDERAL SECTORS
OTHER FEDERAL AGENCIES
MODEL MINING LAW
ENFORCEMENT ACTIVE MINE
WORKSHOP SERIES PLANNED
AVAILABLE DATA ANALYZED
INTERSTATE STANDARDS FOR 21 STATES
APPROVED W.Q. STANDARDS FOR ALL STATES
COMPLETE WQS - PRIVATE SECTOR MINES
FEDERAL REGULATIONS APPROVED
EARLY PLANNING WITH SCREENING MODELS
COMPLETE STAGE I PLANNING
PRELIMINARY PRIORITIES ABANDONED MINES
20% NEW TECHNOLOGY DEVELOPED
COORDINATE FEDERAL AGENCIES
FINANCIAL ASSISTANCE LEGISLATION PROPOSED
NEW LEGISLATION APPROVED
STATES ADOPT
BEGIN ACTIVE MINE COMPLIANCE
APPLY TO FEDERAL LEASES

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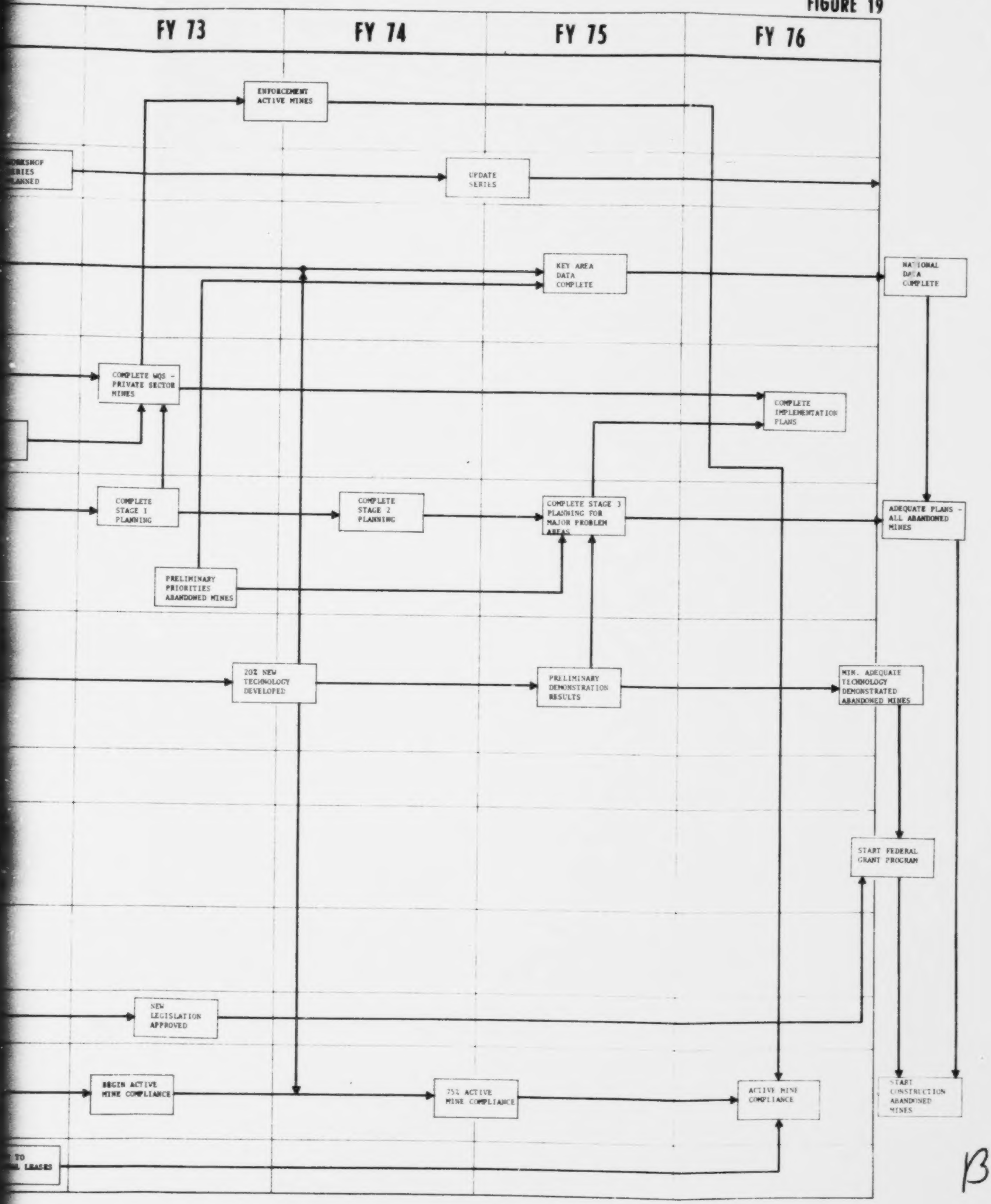
NG AND WELLS
OSED PROGRAM

FIGURE 19


FY 73
FY 74
FY 75
FY 76
ENFORCEMENT ACTIVE MINES
ORKSHOP ERIES LANNED
UPDATE SERIES
KEY AREA DATA COMPLETE
NATIONAL DATA COMPLETE
COMPLETE WQS - PRIVATE SECTOR MINES
COMPLETE IMPLEMENTATION PLANS
COMPLETE STAGE I PLANNING
COMPLETE STAGE 2 PLANNING
COMPLETE STAGE 3 PLANNING FOR MAJOR PROBLEM AREAS
ADEQUATE PLANS - ALL ABANDONED MINES
PRELIMINARY PRIORITIES ABANDONED MINES
20% NEW TECHNOLOGY DEVELOPED
PRELIMINARY DEMONSTRATION RESULTS
MIN. ADEQUATE TECHNOLOGY DEMONSTRATED ABANDONED MINES
START FEDERAL GRANT PROGRAM
NEW LEGISLATION APPROVED
BEGIN ACTIVE MINE COMPLIANCE
75% ACTIVE MINE COMPLIANCE
ACTIVE MINE COMPLIANCE
START CONSTRUCTION ABANDONED MINES
TO LEASES

B

4.7 OTHER WASTES

4.7.1 SUMMARY OF PROBLEM AND STRATEGY FOR ITS SOLUTION

4.7.1.1 Wastes from Watercraft

The discharge of untreated sewage from vessels is commonplace. Very few of the approximately 46,000 documented commercial vessels, 65,000 nondocumented commercial fishing vessels, and eight million recreational watercraft using the navigable waters of the United States are equipped with any type of sewage treatment or retention device. Some classes of vessels will be required to use onboard retention devices and thereby necessitate pump-out or shoreside treatment facilities.

Two steps must be taken to provide adequate and uniform control of the sewage discharge from vessels. A uniform set of vessel effluent standards must be developed along with performance standards and necessary procedures to certify the marine sanitation devices to assure their compliance with the established standards. At the same time packaged onboard sewage treatment devices and shoreside treatment facilities for use at docks and marinas must be developed and their feasibility demonstrated.

4.7.1.2 Recreation Wastes

Greatly increasing demands for recreational facilities on the Nation's waters threaten to overtax waste collection and treatment systems now serving parks and other recreation areas. While no comprehensive assessment has been made, there are treatment design difficulties relating to fluctuating heavy seasonal loads which must be overcome. Therefore, it is essential that an assessment of overall needs, both physical and technological, for recreation areas be made. It is also necessary to establish better coordination between State and Federal recreation agencies and pollution control agencies, since 89 percent of all public recreation lands are federally-owned.

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4.7.1.3 Hydrological Modification

Hydrological modification, while not a pollution problem in itself, vitally affects the impact of any pollutant or residual pollution added to the water body. Any change in the flow regimen changes the character of the ecological system and the added pollutants usually cause magnified problems. An improved technical understanding will be developed to determine the behavior and effects of bridge and causeways. Also necessary is the development of appropriate institutional mechanisms to implement alternative solutions which will achieve modification objectives and at the same time preserve water quality.

4.7.1.4 Construction

Construction of housing, factories, commercial developments, highways and other trappings of urban growth presents a two-fold problem. As areas are cleared for development, the soil is bared and natural drainage is upset and accelerated, causing erosion and sediment-laden runoff.

Sediments threaten public health and safety by carrying harmful bacteria and materials into public water supplies. Excessive sediment also interferes with water treatment operations. In areas with combined sewer systems, increased runoff from rainstorms often overburdens treatment facilities and, consequently, untreated sewage is carried past treatment plants into streams. The cost of treating water is increased when sediment interferes with water supplies. In addition, sediments cause a considerable amount of water to be displaced in reservoirs that are used for water supply, hydroelectric power, flood control, or irrigation.

FWQA sponsored the development of a Community Action Guidebook for Soil Erosion and Sediment Control. The task now is to encourage the adoption of control programs at the local community level. In addition, while the technical controls are available to control construction sedimentation, more effective controls will be needed.

4.7.1.5 Natural Pollution

Increasing population growth and industrial expansion, particularly in coastal areas where surface supplies of fresh water are scarce, place greater and greater demands on subsurface fresh water resources for municipal and industrial supplies. This is a form of pollution that results from the withdrawal of a resource rather than from the addition of a contaminant. As the volume of fresh water withdrawn from underground increases in coastal areas or in areas close to subsurface brines, there is a tendency for salt water to intrude into the aquifers more rapidly than fresh water can recharge the supplies from land drainage, thus reducing the available supplies of usable fresh water.

Salt water intrusion, however, means more than the intrusion of ocean water into fresh water. In its broadest sense, salt water encroachment includes salts of sodium, calcium, magnesium, potassium, and other rarer elements. Critical salt water intrusion problems exist now in New York (Long Island), Florida, Texas and California, and will undoubtedly spread rapidly to other areas as development of the coastal zone continues to increase. All coastal areas, except Alaska, and many inland areas have problems of salt water encroachment into aquifers as well as other ground water quality problems.

Current efforts toward combating this type of pollution are directed toward artificially recharging aquifers with fresh water. This is being done with some success in southern California, but is of limited applicability depending on the availability of high quality fresh water at a suitable location for aquifers recharge. The use of highly treated sewage effluents for ground water recharge is a potential means of control and should be particularly useful in some coastal communities that now discharge their sewage effluent to the ocean. In planning private, corporate, and governmental works, the impact on ground water resources should be included in the scope of planning. Perhaps the best way to combat salt water intrusion is to decrease ground water use through better management of processes requiring water recycling.

4.7.1.6 Dredging

Poor waste disposal practices and the lack of soil conservation efforts have over the years resulted in a huge buildup of polluted deposits on the bottom of rivers, harbors, and lakes. When these materials are released into the water through dredging they naturally result in pollution. Even unpolluted materials released into water may result in unacceptable turbidity levels. Increasing turbidity may also cover and smother shellfish and fish spawning areas resulting in severe reduction and/or elimination of the specie population in the area.

Dumping or disposal of dredged materials on shoreline land, the development of shorelines, and the draining of marshlands result in the destruction of ecologically necessary swamps and wetlands. In many cases, these areas are presumed valueless in their natural condition and, therefore, appear ripe for use as dredge soil disposal sites and for development. When used for either dumping or development, the area is destroyed and an important link in the ecological chain is eliminated.

The control of dredging in unpolluted and ecologically necessary areas (marshes, swamps, etc.) requires: development of better dredging criteria; design and operation of a system to measure the incremental encroachment upon the wetlands, to locate those areas being "overdeveloped" or developed haphazardly within one year; and determination of the short- and long-term effects on the ecosystem.

Practically all significant dredging activity for navigation is performed or controlled by the Federal Government, particularly the Army Corps of Engineers. Existing tools for control of federally-performed dredging include: Environmental Policy Act of 1970 and implementing Executive Order; Executive Order 11507; and proposed Great Lakes legislation to authorize a program providing diked disposal areas.

4.7.2 ANTICIPATED ACCOMPLISHMENTS FOR THE PROPOSED PROGRAM

Fiscal Year 1971

- Promulgate vessel waste treatment standards.
- Collect basic data on recreation areas, salt water intrusion, dredge and fill, and sediment runoff.

Fiscal Year 1972

- Develop certification procedures for vessel waste treatment devices.
- Determine effects of hydrological modifications, dredging, ground water recharge, sediment runoff control, and salt water intrusion.
- Assess recreation area needs and treatment.

Fiscal Year 1973-1976

- Complete input to effluent standards for recreation vessels.
- Prepare construction runoff control legislation.
- Implement standards for new vessels.
- Coordinate effluent standards for military vessels.
- Identify recreation area needs.

- Pass new legislation for construction runoff.
- Develop necessary training for recreation area devices.
- Develop standards for ground water recharge, dredging activities, construction runoff, and recreation vessels.
- Develop onboard treatment devices and recreation area treatment devices.
- Develop abatement guides for military construction.
- Achieve 90 percent control of vessel wastes.
- Implement standards for all vessels.
- Coordinate with other agencies on dredging activities.

4.7.3 SUMMARY OF PROGRAMS

Major milestones and interrelationships of the optimum and proposed programs are shown in Figures 20 and 21 respectively. Differences in the levels of accomplishment for the two programs are shown in Table 15.

TABLE 15

OTHER WASTES
ACTIVITIES AND IMPACT

ACTIVITY	OPTIMUM PROGRAM	PROPOSED PROGRAM	IMPACT
Wastes from Watercraft			
Research, Development and Demonstration	Develop and demonstrate treatment devices for vessels	No change	None
	Develop and demonstrate shoreside pump-out and treatment facilities	No change	None
Technical Support	Prepare effluent standards for vessel treatment devices	No change	None
	Prepare certification procedures	No change	None
Water Quality Standards	Implement effluent standards for all vessels	No change	None
Federal Activities	Coordinate effluent standards for military vessels	No change	None
Other Federal Agencies	Enforcement of vessel effluent standards by Coast Guard	No change	None
Recreational Use			
Research, Development and Demonstration	Determine character and volume of recreational facility wastes and evaluate treatment methods	Deferred two years; full funding beginning FY 1973	Changes impact no major program milestones.
	Develop and demonstrate specialized waste treatment systems	No change	None
Manpower and Training	Determine manpower and training needs	Deferred two years	No major change.
Technical Support	Establish data base for water quality standards development and define effects of recreational use on water quality	No change	None
Federal Activities	Identify need for waste treatment	Deferred two years	No major change.
Hydrologic Modification			
Research, Development and Demonstration	Prepare state-of-the-art report	Deferred three years	No major change.
Basin Planning	Define problem and identify technical and nontechnical constraints	No change	None
	Implement final methodology	No change	None
Technical Support	Quantify water quality impacts	No change	None
	Establish data base, i.e. inventory	No change	None
Natural Pollution			
Research, Development and Demonstration	Investigate control methods for siltation	No change	None
	Evaluation control methods for salt water intrusion	No change	None
	Assessment of natural pollution problem	No change	None
Technical Support	Determine feasibility of controlling natural mineral springs	No change	None

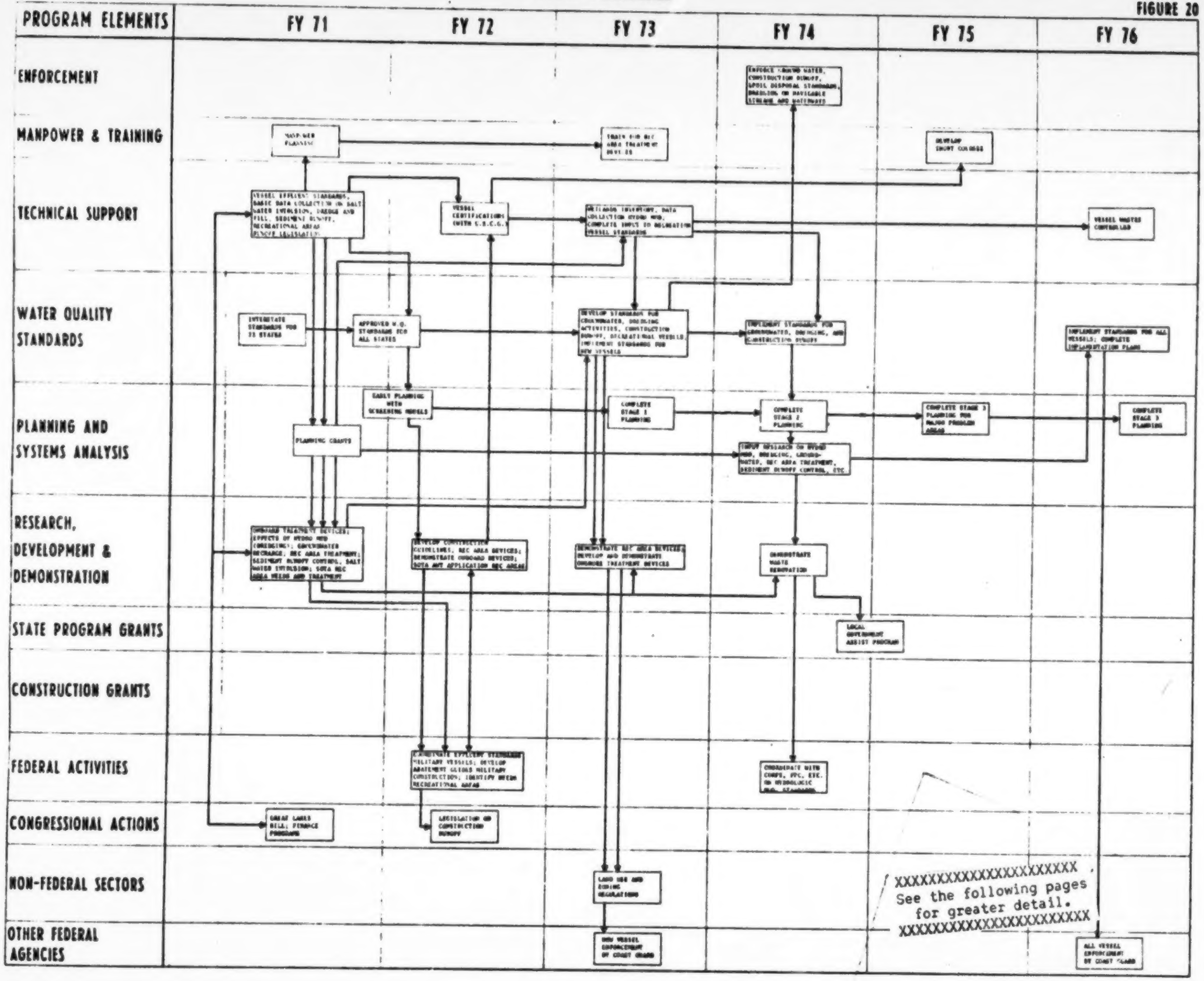
TABLE 15 (continued)

OTHER WASTES
ACTIVITIES AND IMPACT

ACTIVITY	OPTIMUM PROGRAM	PROPOSED PROGRAM	IMPACT
Enforcement	Determine feasibility of salinity control; demineralization of natural springs	No change	None
	Develop and implement ground water policy	No change	None
Congressional Actions	Legislation on ground water use	No change	None
Dredging and Filling			
Research, Development and Demonstration	Determine efforts of dredging and alternative methods of dredge spoil disposal; effects of canalization and filling of wetlands	No change	None
Technical Support	Conduct wetlands inventory	No change	None
	Develop bottom material criteria	No change	None
Federal Activities	Review and evaluate dredging proposals	FY 1971 reduced by 60%	Delays establishment of 100% effective program.
Congressional Action	Passage of legislation relating to disposal of dredged materials	No change	None
Non-Federal Sectors	Adopt and implement land use and zoning regulations	No change	None
Construction Runoff			
State Program Grants	Local grant assistance program of $1.6 million in FY 1974.	No change	None
Enforcement	Enforce construction runoff standards in FY 1974.	No change	None
Manpower & Training	Develop short courses in FY 1975.	No provisions	Dissemination of knowledge on construction runoff controls is not programmed.
Technical Support	Basic data collection begins FY 1971.	No change	None
Water Quality Standards	Construction runoff standards developed in FY 1973.	No change	None
Research, Development and Demonstration	Effects determination starts FY 1971.	Effects determination starts FY 1972.	Technical base is delayed one year.
	Construction guidelines developed in FY 1972.	No provisions	No guidelines produced for construction industry thru FY 1976.
Federal Activities	Develop abatement guidelines for military construction in FY 1972.	Delay until FY 1975.	Credibility suffers.

OTHER WASTES
OPTIMUM PROGRAM

FIGURE 20


PROGRAM ELEMENTS
FY 71
FY 72
FY 73
FY 74
FY 75
FY 76
ENFORCEMENT
MANPOWER & TRAINING
TECHNICAL SUPPORT
WATER QUALITY STANDARDS
PLANNING AND SYSTEMS ANALYSIS
RESEARCH, DEVELOPMENT & DEMONSTRATION
STATE PROGRAM GRANTS
CONSTRUCTION GRANTS
FEDERAL ACTIVITIES
CONGRESSIONAL ACTIONS
NON-FEDERAL SECTORS
OTHER FEDERAL AGENCIES
ENFORCE GROUND WATER, CONSTRUCTION RUNOFF, SPOIL DISPOSAL STANDARDS, DREDGING ON NAVIGABLE STREAMS AND WATERWAYS
MANPOWER PLANNING
TRAIN FOR REC AREA TREATMENT DEVICES
DEVELOP SHORT COURSES
VESSEL EFFLUENT STANDARDS, BASIC DATA COLLECTION ON SALT WATER INTRUSION, DREDGE AND FILL, SEDIMENT RUNOFF, RECREATIONAL AREAS RUNOFF LEGISLATION
VESSEL CERTIFICATIONS (WITH U.S.C.G.)
WETLANDS INVENTORY, DATA COLLECTION HYDRO MOD, COMPLETE INPUT TO DELEGATION VESSEL STANDARDS
VESSEL WASTES CONTROLLED
INTERSTATE STANDARDS FOR 33 STATES
APPROVED W.Q. STANDARDS FOR ALL STATES
DEVELOP STANDARDS FOR GROUNDWATER, DREDGING ACTIVITIES, CONSTRUCTION RUNOFF, RECREATIONAL VESSELS, IMPLEMENT STANDARDS FOR NEW VESSELS
IMPLEMENT STANDARDS FOR GROUNDWATER, DREDGING, AND CONSTRUCTION RUNOFF
IMPLEMENT STANDARDS FOR ALL VESSELS; COMPLETE IMPLEMENTATION PLANS
EARLY PLANNING WITH SCREENING MODELS
PLANNING GRANTS
COMPLETE STAGE 1 PLANNING
COMPLETE STAGE 2 PLANNING
COMPLETE STAGE 3 PLANNING FOR MAJOR PROBLEM AREAS
COMPLETE STAGE 3 PLANNING
INPUT RESEARCH ON HYDRO MOD, DREDGING, GROUNDWATER, REC AREA TREATMENT, SEDIMENT RUNOFF CONTROL, ETC.
ONBOARD TREATMENT DEVICES; EFFECTS OF HYDRO MOD (DREDGING); GROUNDWATER RECHARGE, REC AREA TREATMENT; SEDIMENT RUNOFF CONTROL, SALT WATER INTRUSION; SOTA REC AREA NEEDS AND TREATMENT
DEVELOP CONSTRUCTION GUIDELINES, REC AREA DEVICES; DEMONSTRATE ONBOARD DEVICES; SOTA AWT APPLICATION REC AREAS
DEMONSTRATE REC AREA DEVICES; DEVELOP AND DEMONSTRATE ONSHORE TREATMENT DEVICES
DEMONSTRATE WASTE RENOVATION
LOCAL GOVERNMENT ASSIST PROGRAM
COORDINATE EFFLUENT STANDARDS MILITARY VESSELS; DEVELOP ABATEMENT GUIDES MILITARY CONSTRUCTION; IDENTIFY NEEDS RECREATIONAL AREAS
COORDINATE WITH CORPS, FPC, ETC. ON HYDROLOGIC MOD. STANDARDS
GREAT LAKES BILL; FINANCE PROGRAMS
LEGISLATION ON CONSTRUCTION RUNOFF
LAND USE AND ZONING REGULATIONS
NEW VESSEL ENFORCEMENT BY COAST GUARD
ALL VESSEL ENFORCEMENT BY COAST GUARD

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See the following pages
for greater detail.
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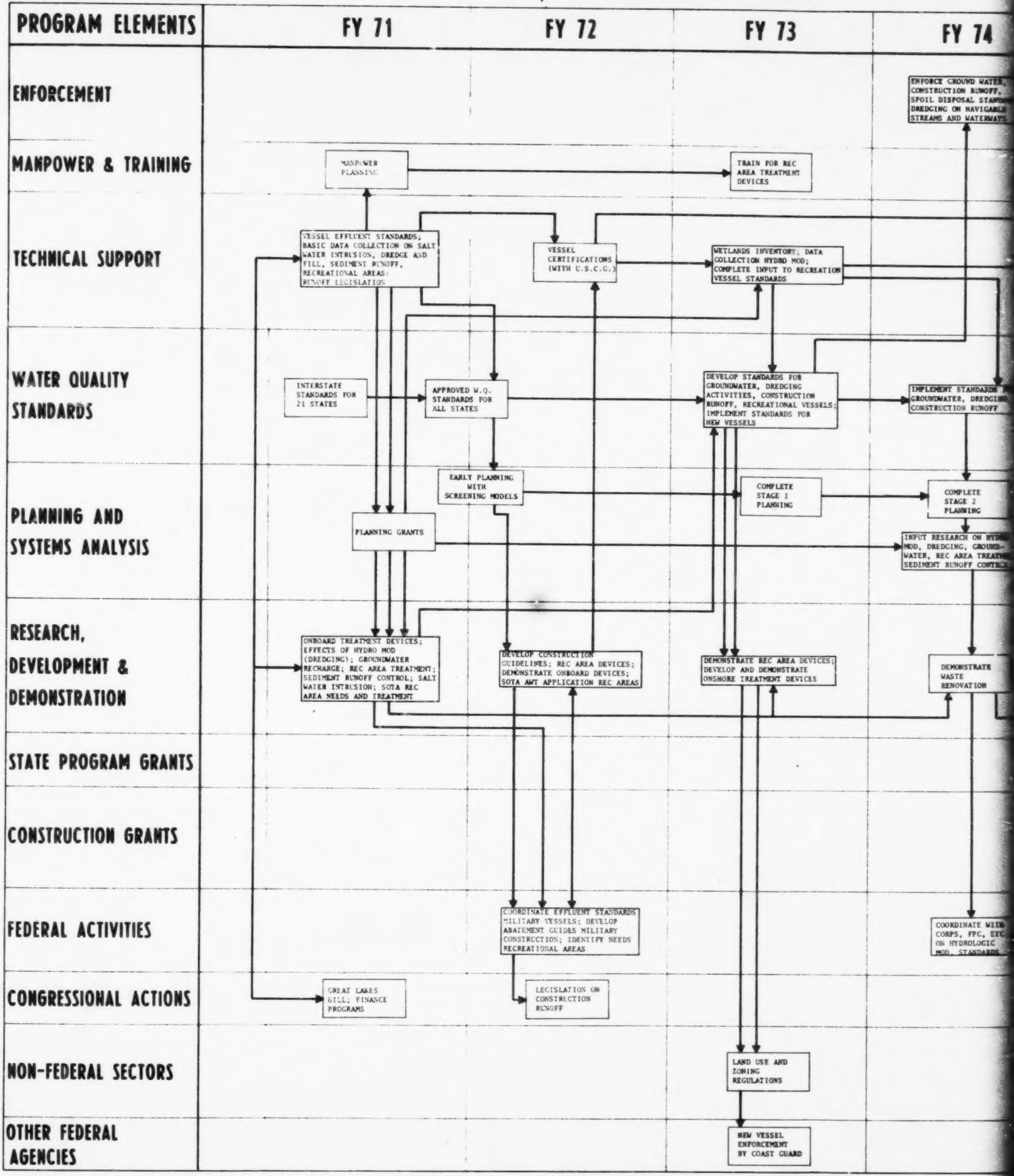
OTHER WASTES
OPTIMUM PROGRAM


PROGRAM ELEMENTS
FY 71
FY 72
FY 73
FY 74
ENFORCEMENT
MANPOWER & TRAINING
TECHNICAL SUPPORT
WATER QUALITY STANDARDS
PLANNING AND SYSTEMS ANALYSIS
RESEARCH, DEVELOPMENT & DEMONSTRATION
STATE PROGRAM GRANTS
CONSTRUCTION GRANTS
FEDERAL ACTIVITIES
CONGRESSIONAL ACTIONS
NON-FEDERAL SECTORS
OTHER FEDERAL AGENCIES
ENFORCE GROUND WATER, CONSTRUCTION RUNOFF, SPOIL DISPOSAL STAN DREDGING ON NAVIGAB STREAMS AND WATERWAY
MANPOWER PLANNING
TRAIN FOR REC AREA TREATMENT DEVICES
VESSEL EFFLUENT STANDARDS; BASIC DATA COLLECTION ON SALT WATER INTRUSION, DREDGE AND FILL, SEDIMENT RUNOFF, RECREATIONAL AREAS: RUNOFF LEGISLATION
VESSEL CERTIFICATIONS (WITH U.S.C.G.)
WETLANDS INVENTORY; DATA COLLECTION HYDRO MOD; COMPLETE INPUT TO RECREATION VESSEL STANDARDS
INTERSTATE STANDARDS FOR 21 STATES
APPROVED W.Q. STANDARDS FOR ALL STATES
DEVELOP STANDARDS FOR GROUNDWATER, DREDGING ACTIVITIES, CONSTRUCTION RUNOFF, RECREATIONAL VESSELS; IMPLEMENT STANDARDS FOR NEW VESSELS
IMPLEMENT STANDARDS GROUNDWATER, DREDGI CONSTRUCTION RUNOFF
EARLY PLANNING WITH SCREENING MODELS
PLANNING GRANTS
COMPLETE STAGE 1 PLANNING
COMPLETE STAGE 2 PLANNING
INPUT RESEARCH ON HYD MOD, DREDGING, GROUND-WATER, REC AREA TREAT SEDIMENT RUNOFF CONTR
ONBOARD TREATMENT DEVICES; EFFECTS OF HYDRO MOD (DREDGING); GROUNDWATER RECHARGE; REC AREA TREATMENT; SEDIMENT RUNOFF CONTROL; SALT WATER INTRUSION; SOTA REC AREA NEEDS AND TREATMENT
DEVELOP CONSTRUCTION GUIDELINES; REC AREA DEVICES; DEMONSTRATE ONBOARD DEVICES; SOTA AWT APPLICATION REC AREAS
DEMONSTRATE REC AREA DEVICES; DEVELOP AND DEMONSTRATE ONSHORE TREATMENT DEVICES
DEMONSTRATE WASTE RENOVATION
COORDINATE EFFLUENT STANDARDS MILITARY VESSELS; DEVELOP ABATEMENT GUIDES MILITARY CONSTRUCTION; IDENTIFY NEEDS RECREATIONAL AREAS
COORDINATE WITH CORPS, FPC, ETC ON HYDROLOGIC MOD, STANDARDS
GREAT LAKES BILL; FINANCE PROGRAMS
LEGISLATION ON CONSTRUCTION RUNOFF
LAND USE AND ZONING REGULATIONS
NEW VESSEL ENFORCEMENT BY COAST GUARD

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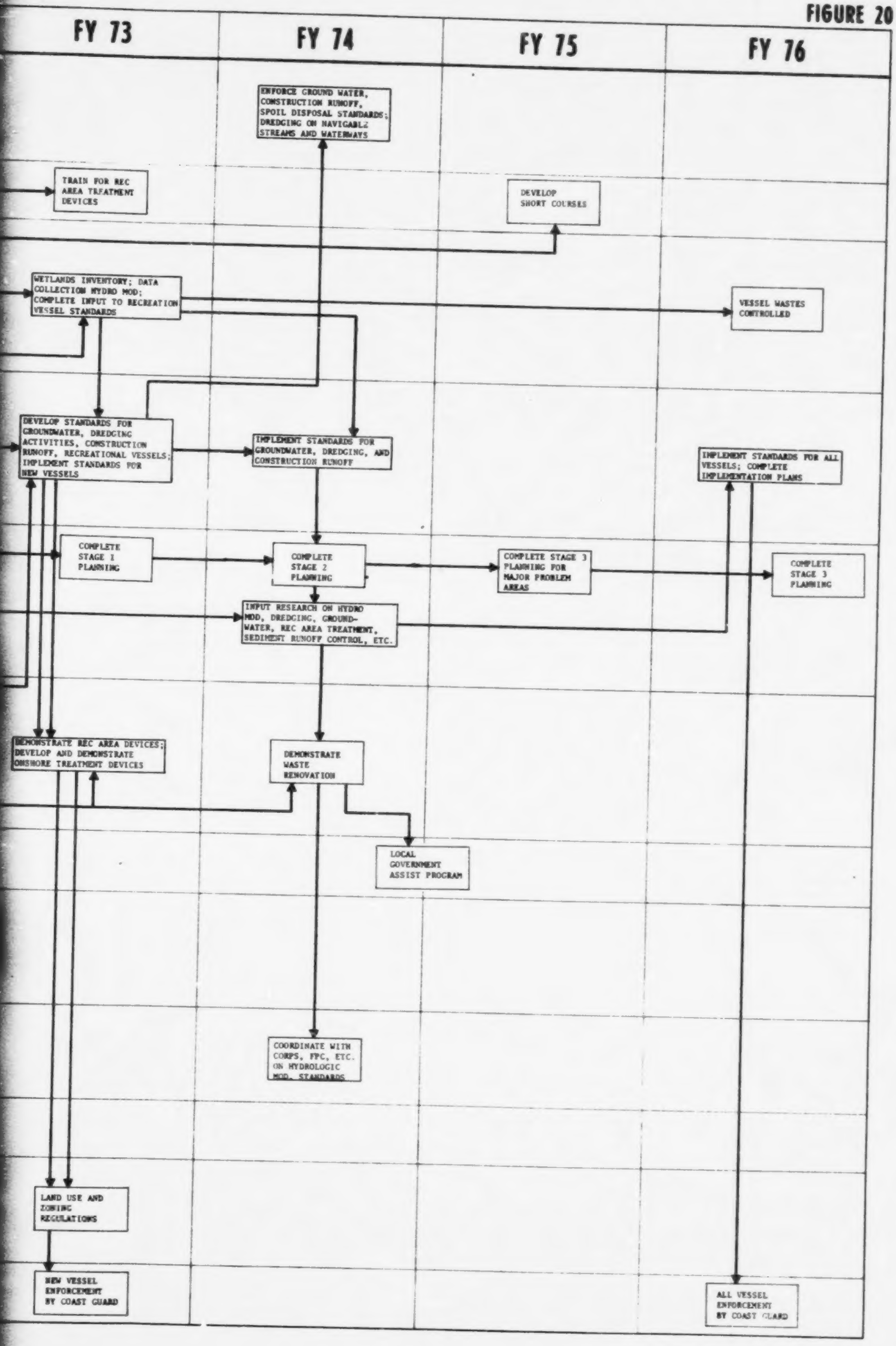
A

WASTES
PROGRAM

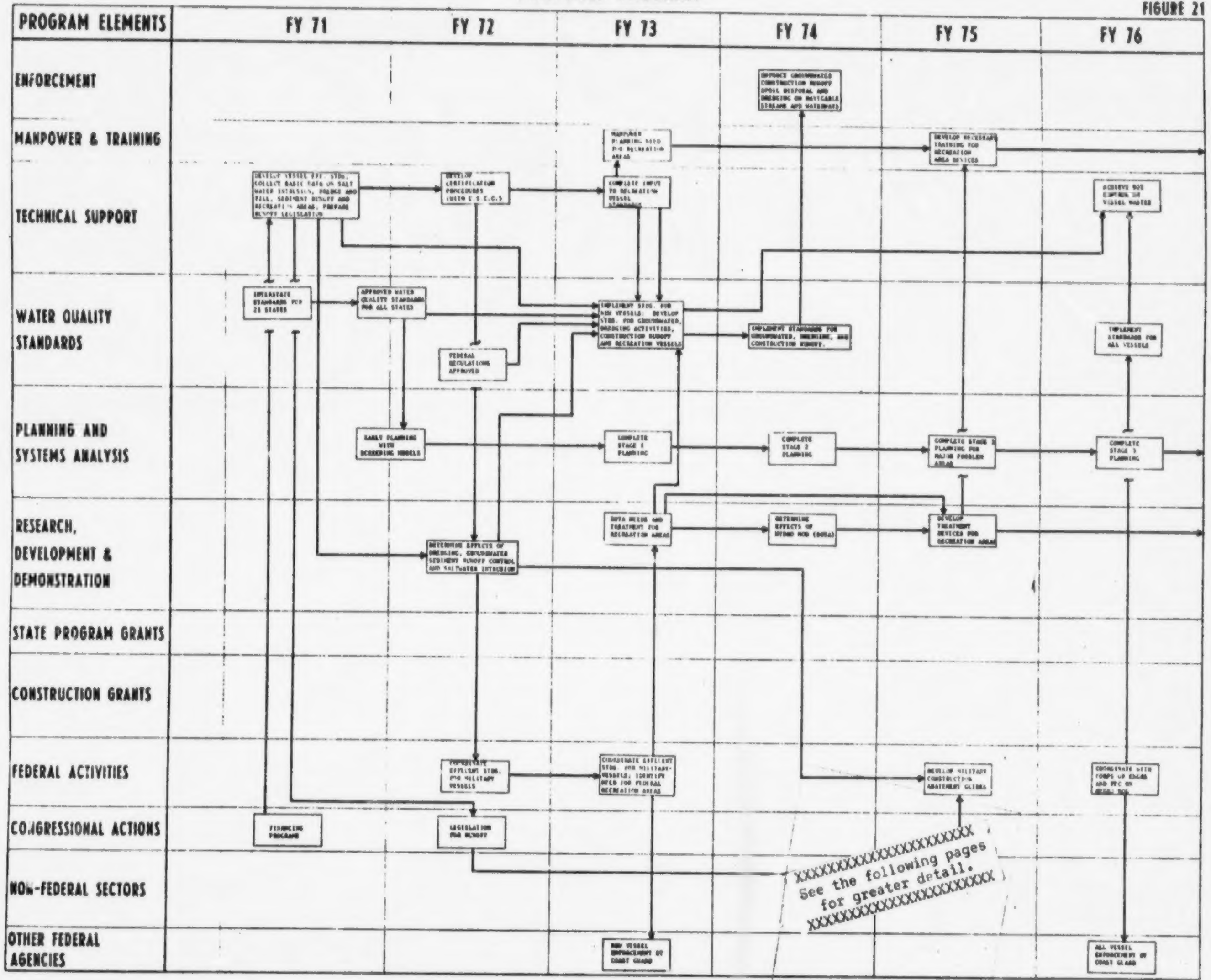
FIGURE 20


FY 73
FY 74
FY 75
FY 76
ENFORCE GROUND WATER, CONSTRUCTION RUNOFF, SPOIL DISPOSAL STANDARDS; DREDGING ON NAVIGABLE STREAMS AND WATERWAYS
TRAIN FOR REC AREA TREATMENT DEVICES
DEVELOP SHORT COURSES
WETLANDS INVENTORY; DATA COLLECTION HYDRO MOD; COMPLETE INPUT TO RECREATION VESSEL STANDARDS
VESSEL WASTES CONTROLLED
DEVELOP STANDARDS FOR GROUNDWATER, DREDGING ACTIVITIES, CONSTRUCTION RUNOFF, RECREATIONAL VESSELS; IMPLEMENT STANDARDS FOR NEW VESSELS
IMPLEMENT STANDARDS FOR GROUNDWATER, DREDGING, AND CONSTRUCTION RUNOFF
IMPLEMENT STANDARDS FOR ALL VESSELS; COMPLETE IMPLEMENTATION PLANS
COMPLETE STAGE I PLANNING
COMPLETE STAGE 2 PLANNING
COMPLETE STAGE 3 PLANNING FOR MAJOR PROBLEM AREAS
COMPLETE STAGE 3 PLANNING
INPUT RESEARCH ON HYDRO MOD, DREDGING, GROUNDWATER, REC AREA TREATMENT, SEDIMENT RUNOFF CONTROL, ETC.
DEMONSTRATE REC AREA DEVICES; DEVELOP AND DEMONSTRATE ONSHORE TREATMENT DEVICES
DEMONSTRATE WASTE RENOVATION
LOCAL GOVERNMENT ASSIST PROGRAM
COORDINATE WITH CORPS, FPC, ETC. ON HYDROLOGIC MOD. STANDARDS
LAND USE AND ZONING REGULATIONS
NEW VESSEL ENFORCEMENT BY COAST GUARD
ALL VESSEL ENFORCEMENT BY COAST GUARD

B

OTHER WASTES
PROPOSED PROGRAM

FIGURE 21


PROGRAM ELEMENTS
FY 71
FY 72
FY 73
FY 74
FY 75
FY 76
ENFORCEMENT
MANPOWER & TRAINING
TECHNICAL SUPPORT
WATER QUALITY STANDARDS
PLANNING AND SYSTEMS ANALYSIS
RESEARCH, DEVELOPMENT & DEMONSTRATION
STATE PROGRAM GRANTS
CONSTRUCTION GRANTS
FEDERAL ACTIVITIES
CONGRESSIONAL ACTIONS
NON-FEDERAL SECTORS
OTHER FEDERAL AGENCIES
DEVELOP VESSEL EFF. STDS. COLLECT BASIC DATA ON SALT WATER INTRUSION, DREDGE AND FILL, SEDIMENT RUNOFF AND RECREATION AREAS, PREPARE RUNOFF LEGISLATION
INTERSTATE STANDARDS FOR 21 STATES
APPROVED WATER QUALITY STANDARDS FOR ALL STATES
EARLY PLANNING WITH SCREENING MODELS
FINANCING PROGRAMS
DEVELOP CERTIFICATION PROCEDURES (WITH U.S.C.G.)
FEDERAL REGULATIONS APPROVED
DETERMINE EFFECTS OF DREDGING, GROUNDWATER SEDIMENT RUNOFF CONTROL AND SALTWATER INTRUSION
COORDINATE EFFLUENT STDS. FOR MILITARY VESSELS
LEGISLATION FOR RUNOFF
MANPOWER PLANNING NEED FOR RECREATION AREAS
COMPLETE INPUT TO RECREATION VESSEL STANDARDS
IMPLEMENT STDS. FOR NEW VESSELS: DEVELOP STDS. FOR GROUNDWATER, DREDGING ACTIVITIES, CONSTRUCTION RUNOFF AND RECREATION VESSELS
COMPLETE STAGE 1 PLANNING
DATA NEEDS AND TREATMENT FOR RECREATION AREAS
COORDINATE EFFLUENT STDS. FOR MILITARY VESSELS; IDENTIFY NEED FOR FEDERAL RECREATION AREAS
NEW VESSEL ENFORCEMENT BY COAST GUARD
ENFORCE GROUNDWATER CONSTRUCTION RUNOFF SPOIL DISPOSAL AND DREDGING ON NAVIGABLE STREAMS AND WATERWAYS
IMPLEMENT STANDARDS FOR GROUNDWATER, DREDGING, AND CONSTRUCTION RUNOFF.
COMPLETE STAGE 2 PLANNING
DETERMINE EFFECTS OF HYDRO MOD (DATA)
DEVELOP NECESSARY TRAINING FOR RECREATION AREA DEVICES
COMPLETE STAGE 2 PLANNING FOR MAJOR PROBLEM AREAS
DEVELOP TREATMENT DEVICES FOR RECREATION AREAS
DEVELOP MILITARY CONSTRUCTION ABATEMENT GUIDES
ACHIEVE 90% CONTROL OF VESSEL WASTES
IMPLEMENT STANDARDS FOR ALL VESSELS
COMPLETE STAGE 3 PLANNING
COORDINATE WITH CORPS OF ENGRS AND FPC ON HYDRO MOD
ALL VESSEL ENFORCEMENT BY COAST GUARD

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See the following pages
for greater detail.
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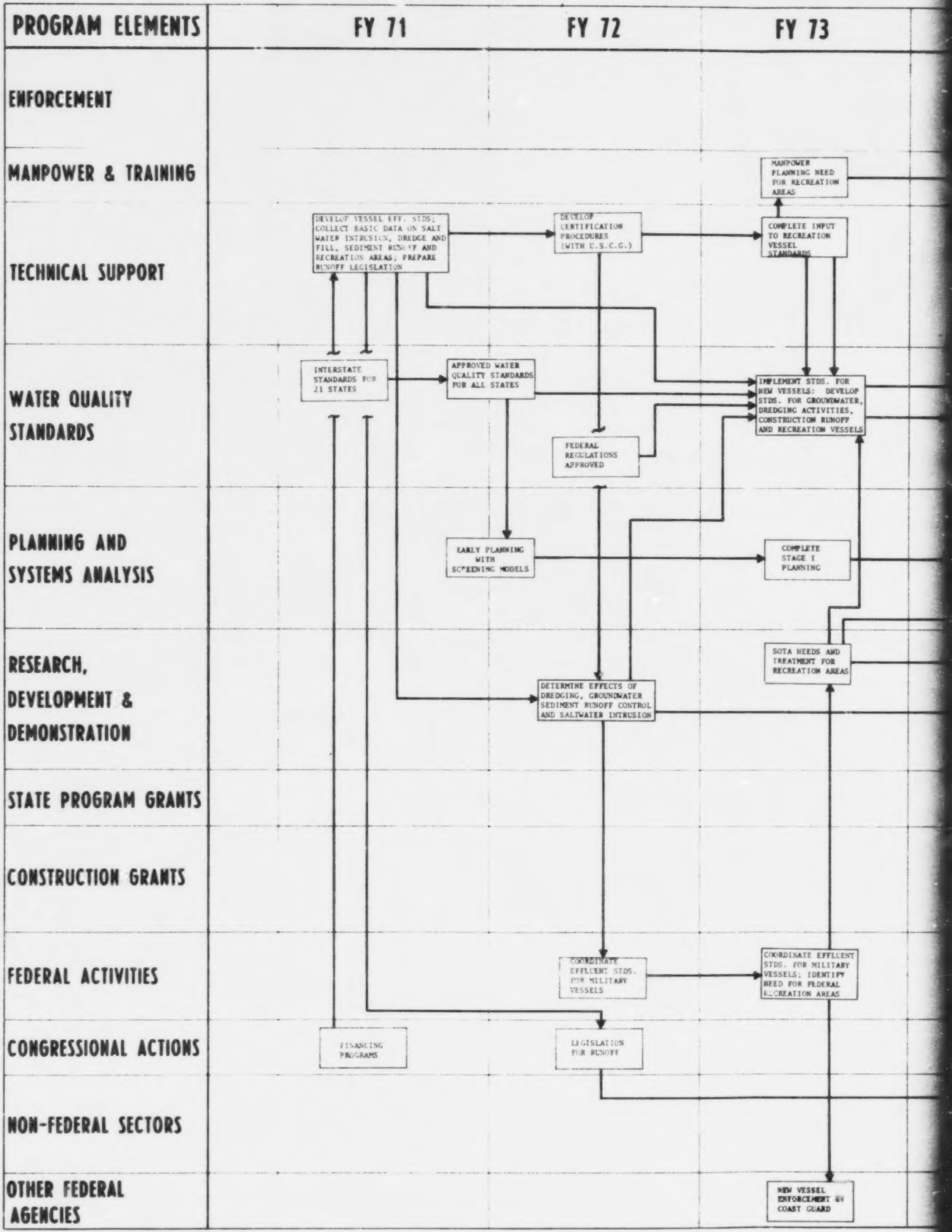
OTHER WASTES
PROPOSED PROGRAM


PROGRAM ELEMENTS
FY 71
FY 72
FY 73
ENFORCEMENT
MANPOWER & TRAINING
TECHNICAL SUPPORT
WATER QUALITY STANDARDS
PLANNING AND SYSTEMS ANALYSIS
RESEARCH, DEVELOPMENT & DEMONSTRATION
STATE PROGRAM GRANTS
CONSTRUCTION GRANTS
FEDERAL ACTIVITIES
CONGRESSIONAL ACTIONS
NON-FEDERAL SECTORS
OTHER FEDERAL AGENCIES
MANPOWER PLANNING NEED FOR RECREATION AREAS
DEVELOP VESSEL EFF. STDS; COLLECT BASIC DATA ON SALT WATER INTRUSION, DREDGE AND FILL, SEDIMENT RUNOFF AND RECREATION AREAS; PREPARE RUNOFF LEGISLATION
DEVELOP CERTIFICATION PROCEDURES (WITH U.S.C.G.)
COMPLETE INPUT TO RECREATION VESSEL STANDARDS
INTERSTATE STANDARDS FOR 21 STATES
APPROVED WATER QUALITY STANDARDS FOR ALL STATES
IMPLEMENT STDS. FOR NEW VESSELS: DEVELOP STDS. FOR GROUNDWATER, DREDGING ACTIVITIES, CONSTRUCTION RUNOFF AND RECREATION VESSELS
FEDERAL REGULATIONS APPROVED
EARLY PLANNING WITH SCREENING MODELS
COMPLETE STAGE I PLANNING
SOTA NEEDS AND TREATMENT FOR RECREATION AREAS
DETERMINE EFFECTS OF DREDGING, GROUNDWATER SEDIMENT RUNOFF CONTROL AND SALTWATER INTRUSION
COORDINATE EFFLUENT STDS. FOR MILITARY VESSELS
COORDINATE EFFLUENT STDS. FOR MILITARY VESSELS; IDENTIFY NEED FOR FEDERAL RECREATION AREAS
FINANCING PROGRAMS
LEGISLATION FOR RUNOFF
NEW VESSEL ENFORCEMENT BY COAST GUARD

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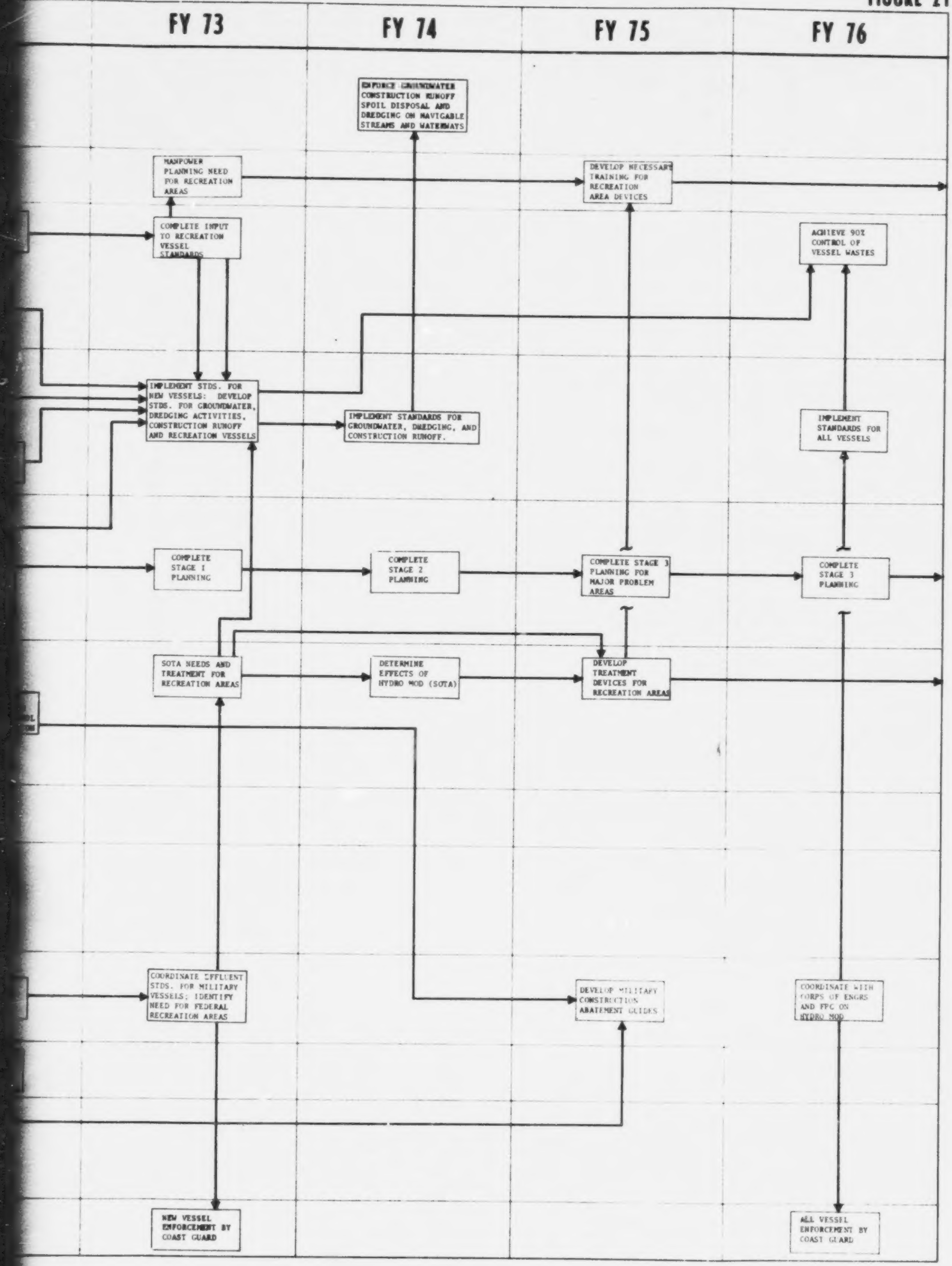
OTHER WASTES
PROPOSED PROGRAM

FIGURE 21


FY 73
FY 74
FY 75
FY 76
ENFORCE GROUNDWATER CONSTRUCTION RUNOFF SPOIL DISPOSAL AND DREDGING ON NAVIGABLE STREAMS AND WATERWAYS
MANPOWER PLANNING NEED FOR RECREATION AREAS
DEVELOP NECESSARY TRAINING FOR RECREATION AREA DEVICES
COMPLETE INPUT TO RECREATION VESSEL STANDARDS
ACHIEVE 90% CONTROL OF VESSEL WASTES
IMPLEMENT STDS. FOR NEW VESSELS: DEVELOP STDS. FOR GROUNDWATER, DREDGING ACTIVITIES, CONSTRUCTION RUNOFF AND RECREATION VESSELS
IMPLEMENT STANDARDS FOR GROUNDWATER, DREDGING, AND CONSTRUCTION RUNOFF.
IMPLEMENT STANDARDS FOR ALL VESSELS
COMPLETE STAGE I PLANNING
COMPLETE STAGE 2 PLANNING
COMPLETE STAGE 3 PLANNING FOR MAJOR PROBLEM AREAS
COMPLETE STAGE 3 PLANNING
SOTA NEEDS AND TREATMENT FOR RECREATION AREAS
DETERMINE EFFECTS OF HYDRO MOD (SOTA)
DEVELOP TREATMENT DEVICES FOR RECREATION AREAS
COORDINATE EFFLUENT STDS. FOR MILITARY VESSELS; IDENTIFY NEED FOR FEDERAL RECREATION AREAS
DEVELOP MILITARY CONSTRUCTION ABATEMENT GUIDES
COORDINATE WITH CORPS OF ENGRS AND FPC ON HYDRO MOD
NEW VESSEL ENFORCEMENT BY COAST GUARD
ALL VESSEL ENFORCEMENT BY COAST GUARD

B

SECTION 5

PROGRAM MANAGEMENT

5.1 PURPOSE

Program management provides the means of developing and carrying out plans to achieve water quality goals by cost-effective use of resources. An objective-oriented management approach is employed by FWQA to implement its National Plan and Strategy for Water Quality. Under this approach, resources are allocated and programs executed in a manner that permits progress toward achievement of objectives to be explicitly measured and controlled by established milestones. With demographic, economic, and water quality information as a base, the scope of the problems will be determined through water quality standards and planning; resources allocated on a rational, scheduled basis; and program implementation directed by monitoring, measuring, and control.

The approach includes the following essential elements:

(1) Planning to assure total identification of problem needs and identification of alternative approaches for achieving solutions.

(2) Action criteria to assess situations and needs, and to establish priorities.

(3) An information system to provide basic management information and to allow dynamic control of progress.

(4) A management commitment to assign responsibility of identified solution-oriented tasks and to measure progress against stated goals for effective control on an ongoing basis.

5.2 SPECIFIC REQUIREMENTS OF FWQA MANAGEMENT

The national strategy for water quality is a dynamic plan that is to be constantly updated as new and better information is obtained. River basin plans for all basins are the basis of the strategy. These will evolve from initial interim plans prepared by the States.

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The basin or regional/metro plans are dynamic entities, subject to continual updating to reflect changing population needs, economic conditions, and pollution levels. These plans also reflect the changing requirements for meeting water quality standards which are, in turn, subject to continual updating. Because of these shifting requirements as defined by planning, FWQA must retain the flexibility to be responsive to changing situations and must be able to adapt to changes in interim goals as determined by current plans. Basin and regional/metro plans, together with action criteria to establish problem priorities, provide the basis for allocation of resources on a scheduled, controlled basis.

The interrelationships of these management components are shown in Figure 22. An integrated information system will provide the means of measuring progress on a dynamic basis and will serve as a management and planning tool, in addition to being a technical operating and monitoring system.

5.3 CRITERIA FOR ACTION

A rational, objective means is being developed to determine how resources should be allocated--that is, a set of criteria for ranking problems, needs, and priorities for action. Although legislative and political constraints place limits on FWQA's ability to direct funds and efforts into areas of greatest need, the increasing level of construction grant funds will permit greater flexibility since there will in all probability be additional funds available for reallocation.

Effective national-level planning can proceed effectively with these action criteria. With quantifiable measures, realistic planning can be done and progress can be measured. In addition, the application of resources in a cost-effective manner can be assured since measures will exist in a visible form.

A set of criteria based on indices which will indicate: (1) severity of pollution, (2) need for abatement, and (3) priority for action in any specified area, is being developed. These indices will be directly involved in development of water basin plans and the evaluation of State programs which are major inputs to the national plans. Together with the cost of action, these indices are important inputs to the Planning, Programming, and Budgeting System (PPBS).

5.4 INFORMATION SYSTEMS

In order to monitor the progress of achieving water quality objectives, management information of some form is essential. For an organization with programs and interfaces as complex as those of FWQA, an automated system is indicated.

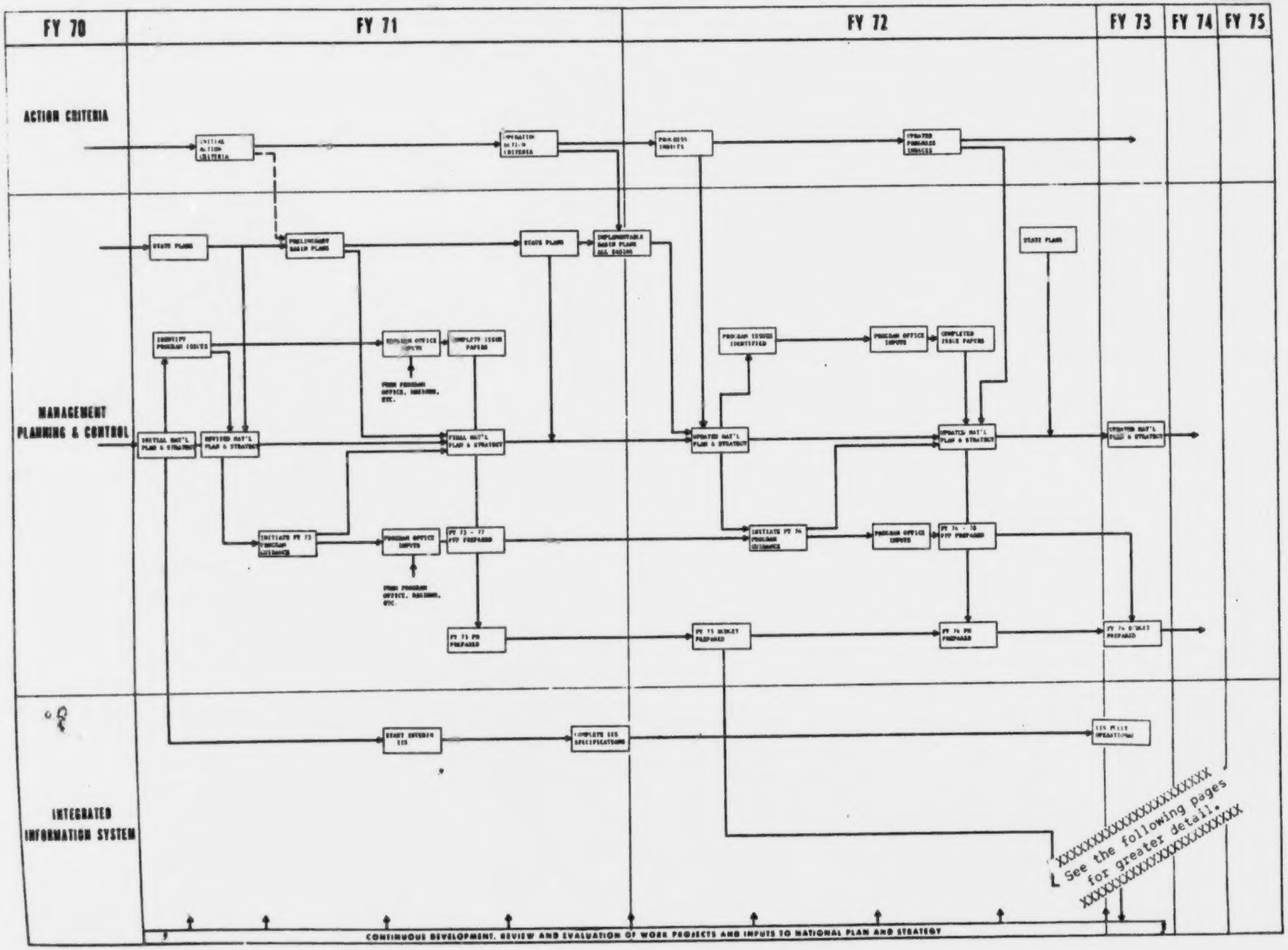
FWQA is currently undertaking an assessment of its total needs for information processing. This is expected to lead to the development of an integrated information system that will provide timely, organization wide information in a form adapted to the needs of each managerial level. Such a system will utilize existing data bases and equipment to the maximum extent practicable.

5.5 FEDERAL ASSISTANCE REVIEW

FWQA must be concerned with the efficiency and effectiveness with which the various grant and control programs are delivered to the user--in most cases States and municipalities. A review of all programs was initiated by FWQA in early 1970 with initial focus on the construction grant program (Construction Grants Study, April 1970). This effort is being upgraded to cover other FWQA grant and technical assistance programs and will, by 1972, form the basis for a continuing administrative audit program.

PROGRAM MANAGEMENT

FIGURE 22



FY 70
FY 71
FY 72
FY 73
FY 74
FY 75
ACTION CRITERIA
MANAGEMENT PLANNING & CONTROL
INTEGRATED INFORMATION SYSTEM
INITIAL ACTION CRITERIA
UPDATED ACTION CRITERIA
PROGRESS INDICES
UPDATED PROGRESS INDICES
STATE PLANS
PRELIMINARY BASIN PLANS
STATE PLANS
IMPLEMENTABLE BASIN PLANS ALL BASINS
STATE PLANS
IDENTIFY PROGRAM ISSUES
REGIONAL OFFICE INPUTS
COMPLETE ISSUE PAPERS
FROM PROGRAM OFFICE, REGIONS, ETC.
INITIAL NAT'L PLAN & STRATEGY
REVISED NAT'L PLAN & STRATEGY
FINAL NAT'L PLAN & STRATEGY
UPDATED NAT'L PLAN & STRATEGY
PROGRAM ISSUES IDENTIFIED
PROGRAM OFFICE INPUTS
COMPLETED ISSUE PAPERS
UPDATED NAT'L PLAN & STRATEGY
UPDATED NAT'L PLAN & STRATEGY
INITIATE FY 73 PROGRAM GUIDANCE
PROGRAM OFFICE INPUTS
FROM PROGRAM OFFICE, REGIONS, ETC.
FY 73 - 77 PFP PREPARED
INITIATE FY 74 PROGRAM GUIDANCE
PROGRAM OFFICE INPUTS
FY 74 - 78 PFP PREPARED
FY 73 PB PREPARED
FY 73 BUDGET PREPARED
FY 74 PB PREPARED
FY 74 BUDGET PREPARED
START INTERIM IIS
COMPLETE IIS SPECIFICATIONS
IIS FULLY OPERATIONAL
CONTINUOUS DEVELOPMENT, REVIEW AND EVALUATION OF WORK PROJECTS AND INPUTS TO NATIONAL PLAN AND STRATEGY

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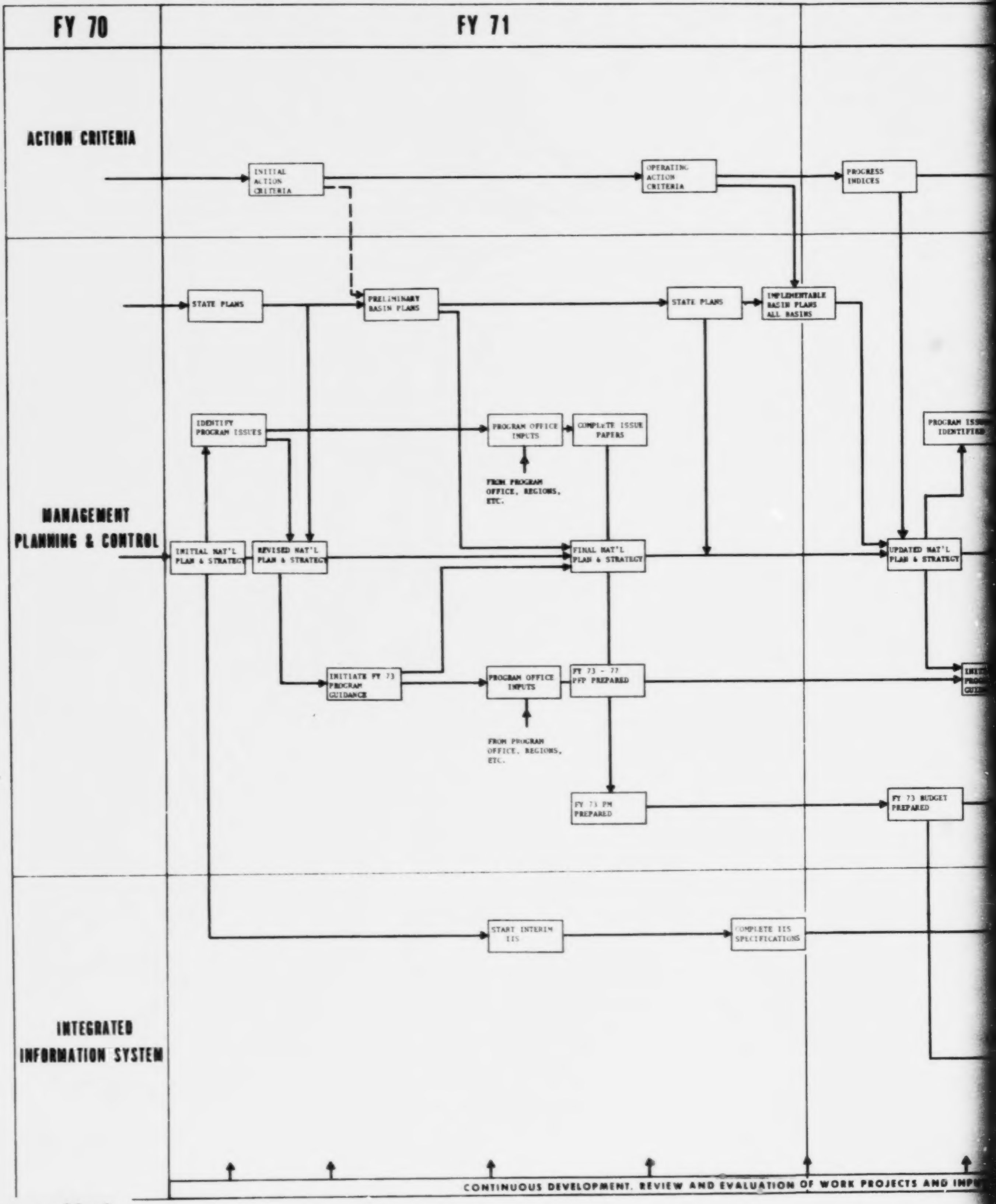
PROGRAM MANAGEM


FY 70
FY 71
ACTION CRITERIA
INITIAL ACTION CRITERIA
OPERATING ACTION CRITERIA
PROGRESS INDICES
STATE PLANS
PRELIMINARY BASIN PLANS
STATE PLANS
IMPLEMENTABLE BASIN PLANS ALL BASINS
IDENTIFY PROGRAM ISSUES
PROGRAM OFFICE INPUTS
COMPLETE ISSUE PAPERS
FROM PROGRAM OFFICE, REGIONS, ETC.
PROGRAM ISSU IDENTIFIED
MANAGEMENT PLANNING & CONTROL
INITIAL NAT'L PLAN & STRATEGY
REVISED NAT'L PLAN & STRATEGY
FINAL NAT'L PLAN & STRATEGY
UPDATED NAT'L PLAN & STRATEGY
INITIATE FY 73 PROGRAM GUIDANCE
PROGRAM OFFICE INPUTS
FY 73 - 77 PFP PREPARED
FROM PROGRAM OFFICE, REGIONS, ETC.
FY 73 PM PREPARED
FY 73 BUDGET PREPARED
INTEGRATED INFORMATION SYSTEM
START INTERIM IIS
COMPLETE IIS SPECIFICATIONS
CONTINUOUS DEVELOPMENT, REVIEW AND EVALUATION OF WORK PROJECTS AND INPU

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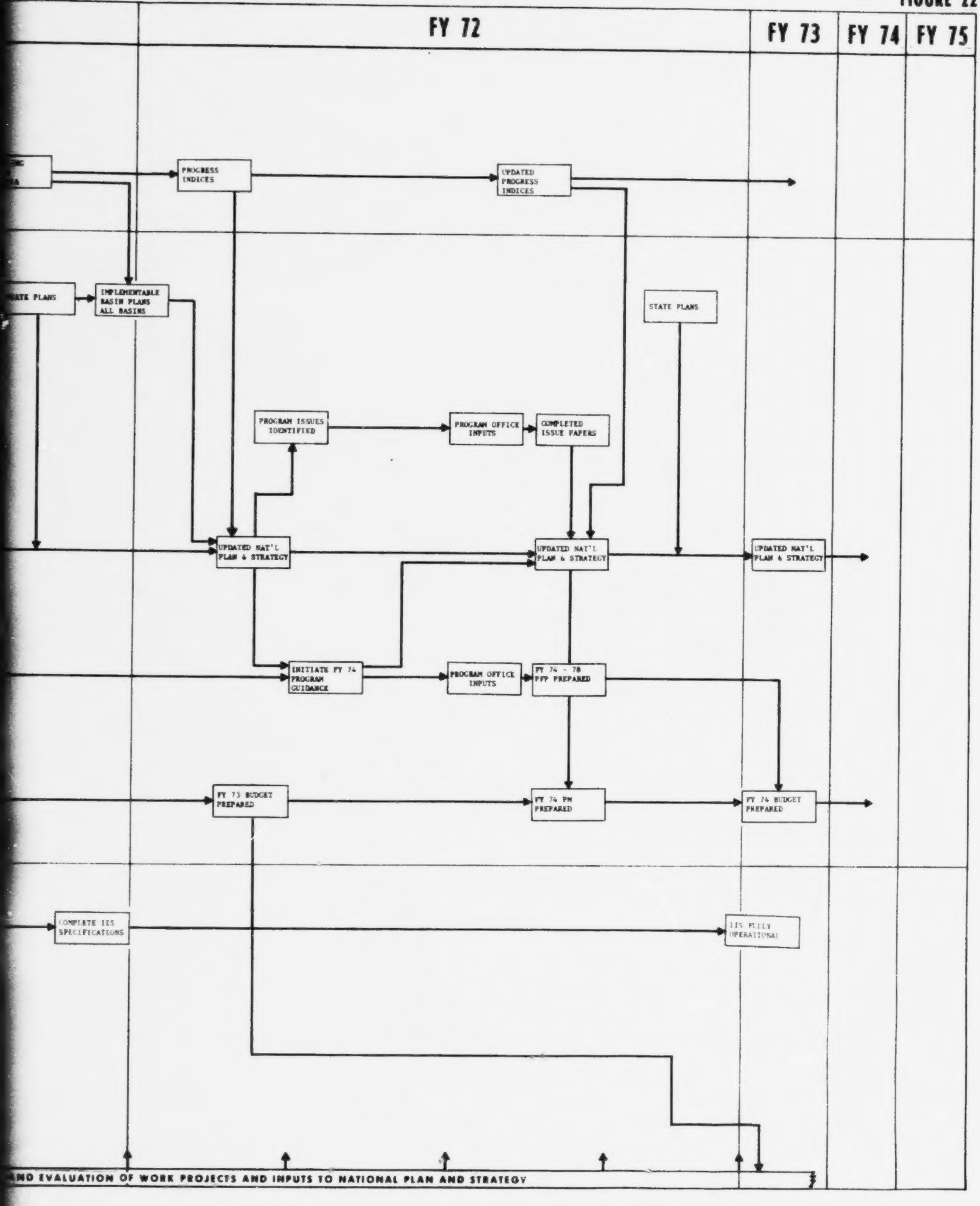
PROGRAM MANAGEMENT

FIGURE 22


FY 72
FY 73
FY 74
FY 75
PROGRESS INDICES
UPDATED PROGRESS INDICES
STATE PLANS
IMPLEMENTABLE BASIN PLANS ALL BASINS
STATE PLANS
PROGRAM ISSUES IDENTIFIED
PROGRAM OFFICE INPUTS
COMPLETED ISSUE PAPERS
UPDATED NAT'L PLAN & STRATEGY
UPDATED NAT'L PLAN & STRATEGY
UPDATED NAT'L PLAN & STRATEGY
INITIATE FY 74 PROGRAM GUIDANCE
PROGRAM OFFICE INPUTS
FY 74 - 78 PFP PREPARED
FY 73 BUDGET PREPARED
FY 74 PM PREPARED
FY 74 BUDGET PREPARED
COMPLETE IIS SPECIFICATIONS
IIS FULLY OPERATIONAL
AND EVALUATION OF WORK PROJECTS AND INPUTS TO NATIONAL PLAN AND STRATEGY